NASA

Aerospace Medicine and Biology
A Continuing Bibliography with Indexes

NASA SP-7011(268)
February 1985

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SPECIAL NOTICE ENCLOSED
NEW FOREIGN TECHNOLOGY INDEX INCLUDED IN THIS ISSUE

ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges.

STAR (N-10000 Series)	N85-10001 - N85-11975
IAA (A-10000 Series)	A85-10001 - A85-12656

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FOREIGN TECHNOLOGY INDEX IN THIS ISSUE

Documents referred to in this bibliography whose country of intellectual origin is other than the United States are listed in the Foreign Technology Index (see page D-1).

A great deal of excellent scientific and technical work is done throughout the world. To the extent that U.S. researchers, engineers, and industry can utilize what is done in foreign countries, we save our resources. We can thus increase our country's productivity.

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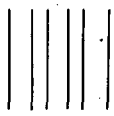

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NASA SP-7011(268)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 268)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in January 1985 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 167 reports, articles and other documents announced during January 1985 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA).* The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by *STAR* categories 51 through 55, the Life Sciences division. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

Six indexes -- subject, personal author, corporate source, contract, report number, and accession number -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1985 Supplements.

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DOMESTIC: NASA and NASA-sponsored documents and a large number of aerospace publications are available to the public for reference purposes at the library maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

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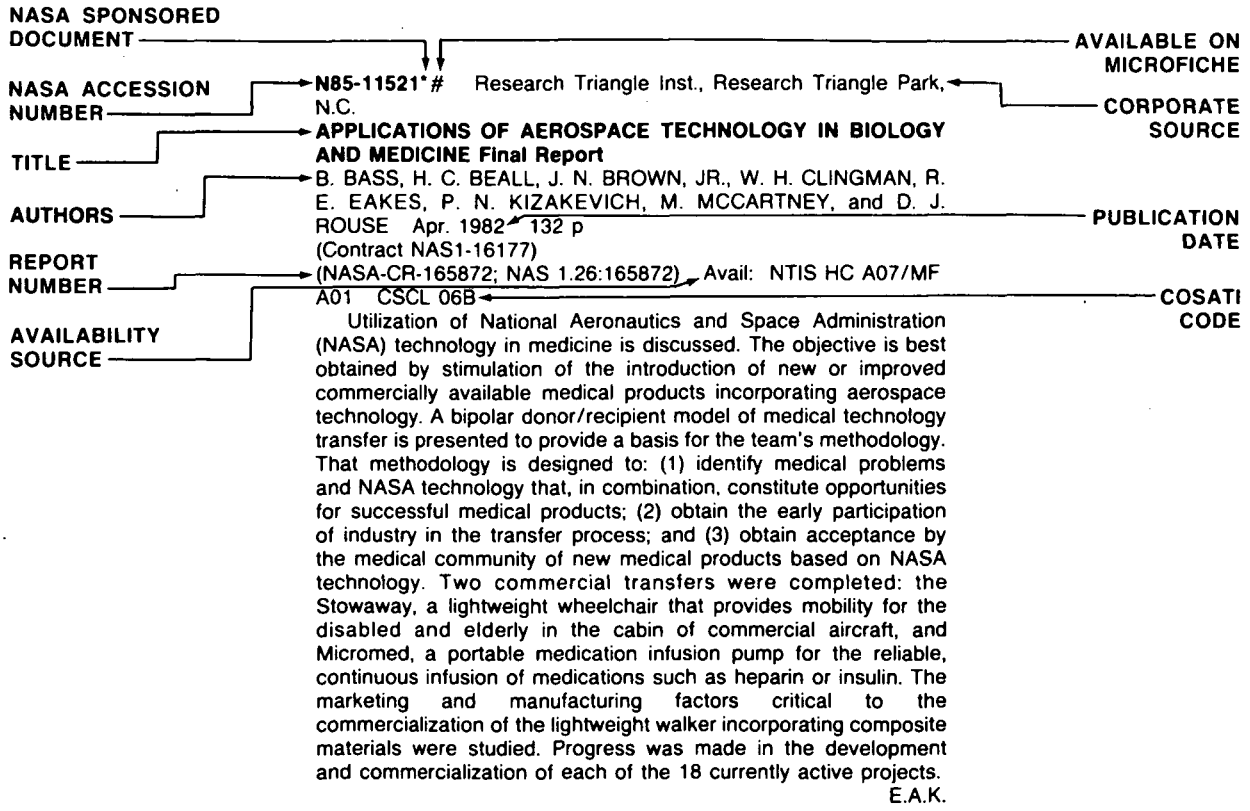

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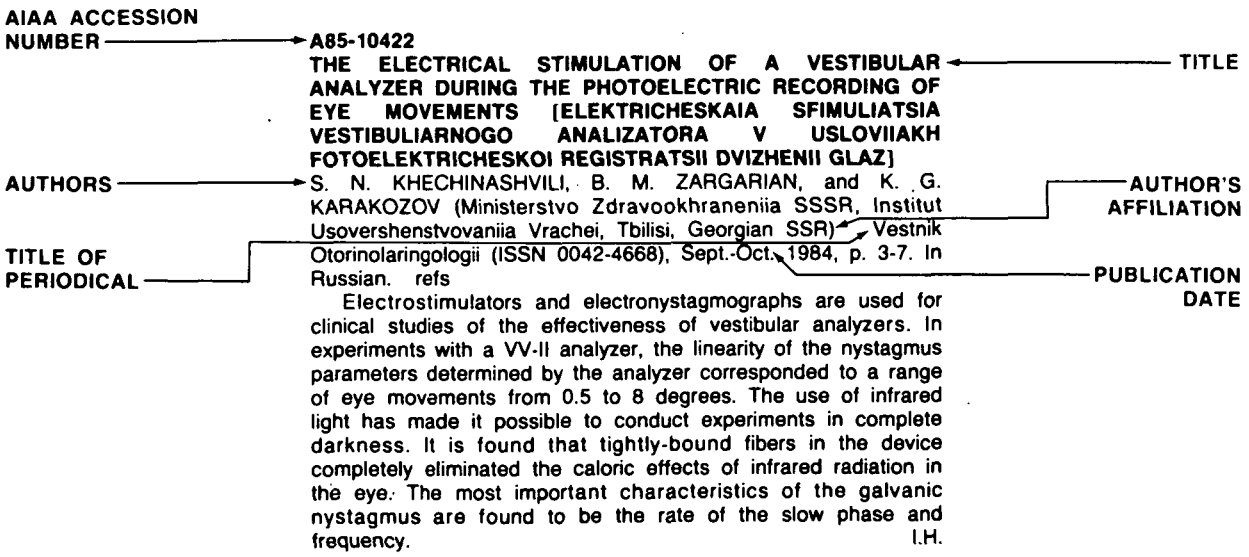

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 268)

FEBRUARY 1985

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LIFE SCIENCES (GENERAL)

Includes genetics.

A85-10173
MECHANISM OF THE INTERACTION OF BIOLOGICAL MOLECULES WITH COHERENT ELECTROMAGNETIC OSCILLATIONS [K MEKHANIZMU VZAIMODEISTVIIA BIOLOGICHESKIKH MOLEKUL S KOGERENTNYMI ELEKTROMAGNITNYMI KOLEBANIIAMI]
N. P. DIDENKO and V. I. ZELENTSOV (Tomskii Politekhnicheskii Institut, Tomsk, USSR) Fizika (ISSN 0021-3411), vol. 27, Aug. 1984, p. 112-114. In Russian. refs

The mechanism of Davydov and Kislukha (1973) describing the transport and storage of energy in proteins by means of solitons is examined. Certain experimental data concerning the interaction of hemoglobin molecules with millimeter-wave radiation can be explained in the framework of this mechanism: (1) the highly resonant character of the interaction; (2) the existence of many resonant frequencies with different responses; and (3) the serial character of the resonant frequencies. L.M.

A85-10294
METABOLISM OF MYOCARDIUM PROTEINS IN DIFFERENT PERIODS OF EXPERIMENTAL HYPOKINESIA IN RATS [METABOLIZM BELKOV MIOKARDA V RAZLICHNYE PERIODY EKSPERIMENTAL'NOI GIPOKINEZII U KRYS]
G. D. SHITOV, E. A. RAPOPORT, and V. A. KAZARIAN (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Patologicheskaia Fiziologiia i Eksperimental'naia Terapiia (ISSN 0031-2991), July-Aug. 1984, p. 36-40. In Russian. refs

A85-10296
MODIFICATIONS INDUCED IN LIPID MULTILAYERS BY AM-241 ALPHA PARTICLES
G. ERRIU, M. LADU, S. ONNIS (Cagliari, Universita, Cagliari, Italy), J. H. TANG, and W. K. CHANG (Chinese Academy of Sciences, Institute of High Energy Physics, Beijing, People's Republic of China; Cagliari, Universita, Cagliari, Italy) Nuovo Cimento, Lettere, Serie 2, vol. 40, Aug. 25, 1984, p. 527-532. refs

A85-10552
MEASUREMENT OF AGGREGATION OF RED CELLS IN SPACE - A PROJECT FOR THE NASA SPACE SHUTTLE
L. DINTENFASS, P. OSMAN, and B. MAGUIRE (Sydney, University, Sydney, Australia) Journal of Electrical and Electronics Engineering, Australia (ISSN 0725-2986), vol. 4, June 1984, p. 118-125. refs

Progress is described on the advanced stages in design of an instrument for the study of red blood cell aggregation and blood viscosity under near-zero gravity conditions. This paper gives a brief review of the experiment and its background and a description of the design of the instrument intended for space conditions. Summaries are given of solutions to some problems peculiar to a space experiment, particularly blood storage, microscope focusing, experiment control and data acquisition. Author

A85-10708
THE EMBRYONIC DEVELOPMENT OF FROGS UNDER STRONG DC MAGNETIC FIELDS
S. UENO, K. HARADA, and K. SHIOKAWA (Kyushu University, Fukuoka, Japan) (IEEE, Verband Deutscher Elektrotechniker, and Arbeitsgemeinschaft Magnetismus, International Magnetics Conference, Hamburg, West Germany, Apr. 9-13, 1984) IEEE Transactions on Magnetics (ISSN 0018-9464), vol. MAG-20, Sept. 1984, pt. 2, p. 1663-1665. Sponsorship: Ministry of Education of Japan. refs
(Contract MOE-58460149)

Possible influence of d.c. magnetic fields on the early embryonic development of frogs was studied. Embryos of African clawed toads, Xenopus laevis, were exposed to 1.0 T magnetic fields with different gradients of a range from 10 T/m to 1000 T/m either during cleavage to neurula stage, blastula to neurula stage, or neurula to tail bud stage. The developmental processes of embryos during and after magnetic field exposures were followed to examine a possibility of teratogenic effects. The results suggest that the magnetic field exerts no harmful or modifying effects on the important morphogenetic movements, such as gastrulation and neurulation. However, it was observed that embryos which were exposed to the gradient magnetic fields during cleavage to neurula stage occasionally developed into tadpoles with reduced pigmentation or some axial anomalies such as the formation of curled tail. Tadpoles with edema or microcephaly were also observed. Compared with the control, the rate of malformation was higher by about 35 percent. The influence of oxygen concentration in Ringer's solution on the embryonic development was also studied, and toxicity of oxygen with high concentration was discussed. Author

A85-10728
INFLUENCE OF THE CHEST WALL ON REGIONAL INTRAPLEURAL PRESSURE DURING ACCELERATION (+GZ) STRESS
H. I. MODELL (Virginia Mason Research Center, Seattle, WA) and F. W. BAUMGARDNER (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 896-902. refs
(Contract F49620-78-C-0058; F49620-81-C-0055)

It is pointed out that the vertical intrapleural pressure gradient has been attributed to the influence of gravity acting on the lung and to lung deformation within the chest wall. The present investigation has the objective to determine the influence of altered chest wall compliance, chest wall shape, and G-suit abdominal bladder inflation on regional intrapleural pressure during exposure to +Gz stress. In selecting the experimental approach, an attempt was made to acquire data covering a spectrum of chest wall characteristics, taking into account a range which would include the characteristics of man. It was felt that the desired spectrum could be obtained by considering dogs and pigs. The data obtained suggest that application of the G-suit abdominal bladder in man without an accompanying M-1 maneuver would result in a larger gas exchange detriment than that expected in the dog and less than that expected in the pig. G.R.

A85-10730
BUBBLE FORMATION OF AQUEOUS HUMOR AND LENS OPACITY DURING CHAMBER FLIGHT
H. S. FANG and H. M. CHEN (National Taiwan University, Taipei, Republic of China) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 910-913. Sponsorship: National Science Council of the Republic of China. refs
(Contract NSC-73-0412-B002-10)

A transparent miniature decompression chamber was placed on the stage of a large-working-distance zoom-stereo microscope so that the effect of decompression on the frog eye could be microscopically observed and photographed. It was found that chamber flight at a simulated altitude of 66,000 ft (20,117 m) or more caused bubble formation in aqueous humor and lens opacities in some of the experimental animals. On return to ground level, the bubbles either decreased in size or completely disappeared. The cataract could also regress after recompression to 1 atm. Such lens opacities may be termed altitude cataract, instead of asphyxial or anoxic cataract. Author

A85-10733
THE EFFECT OF ALLOPURINOL ON OXYGEN-INDUCED SEIZURES IN MICE
S. A. HOPPE, D. J. TERRELL, and S. F. GOTTLIEB (South Alabama, University, Mobile, AL) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 927-930. Research supported by the Hearst Foundation. refs

The occurrence of oxygen toxicity at high pressures and lengths of exposure limits the use of hyperbaric oxygen. The present investigation is concerned with tests regarding the use of allopurinol as a possible protective agent against oxygen-induced seizures. An effect of oxygen toxicity involves the occurrence of seizures. It is thought that these seizures are caused by superoxide-induced effects on neuron membrane structure and/or function, resulting in altered ion transport and transmembrane potentials and, therefore, modified neuron excitability. The results of the investigation demonstrate that only oxygen at high pressure (5 ATA in this case) is conducive to oxygen-induced seizures. The obtained results do not disprove the superoxide theory of tissue damage in the central nervous system. However, the results do not support the theory that superoxide is generated in mouse brain by xanthine oxidase activity. G.R.

A85-10735
STUDIES OF THE ACCURACY OF MEASUREMENTS OF SERUM HIGH DENSITY LIPOPROTEIN CHOLESTEROL LEVELS
D. A. CLARK, N. J. GARCIA, P. R. ROZELL, and E. L. MOSSER (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 941-945. refs

It is pointed out that the concentration of high density lipoprotein cholesterol (HDL-C) in serum and the ratio of total cholesterol to HDL-C are useful factors in predicting the risk of coronary artery disease (CAD) in the general population and in U.S. Air Force aviators. Serum HDL-C levels are commonly measured by precipitating the low- and very-low-density lipoproteins (LDL and VLDL, respectively) and measuring the cholesterol in the supernatant solution. Ideally, all LDL and VLDL should be precipitated, but none of the HDL. The accuracy of HDL-C level measurement depends, therefore, on the degree to which this ideal situation is approached. In the present investigation, significant departures were found from the ideal situation with certain lipemic serums. Reliable estimates of HDL-C levels in lipemic serum may, therefore, require knowledge of the titration curve of the lipoprotein precipitant. G.R.

A85-11010
HYPOXIA AND BRAIN BLOOD FLOW
N. H. EDELMAN, T. V. SANTIAGO, and J. A. NEUBAUER (New Jersey University of Medicine and Dentistry; Rutgers University, New Brunswick, NJ) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 101-113. Research supported by the New Jersey Thoracic Society. refs
(Contract NIH-HL-16022; NIH-HL-23315; NIH-HL-07467)

The characteristics of brain blood flow response to hypoxia at high altitude are described, with reference to a number of experimental investigations. It is suggested that an increase in brain blood flow with acute hypoxia is an important component of the protective physiological response which occurs while climbing at high altitudes. This suggestion is based on the relatively long time constant of the brain blood flow response to acute hypoxia and the removal of CO2 from chemosensitive areas of the brain which appear to modulate ventilation during ascent to high altitude. It is pointed out, however, that hypoxia also causes an unexpectedly brisk increase in brain blood flow during REM sleep which is unrelated to changes in brain metabolism. I.H.

A85-11247
PHYSIOLOGICAL MECHANISMS IN THE REGULATION OF NOCICEPTIVE SENSITIVITY [FIZIOLOGICHESKIE MEKHANIZMY REGULIATSII BOLEVOI CHUVSTVITEL'NOSTI]
L. V. KALIUZHNYI (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Moscow, Izdatel'stvo Meditsina, 1984, 216 p. In Russian. refs

The major physiological and neurochemical mechanisms of nociceptive stimulation are discussed systematically. Particular attention is given to the significance of interactions between nociceptive and antinociceptive endogenous systems in the generation of pain and in the regulation of pain sensitivity. On the basis of experimental data from the literature, the physiological and neurochemical properties of antinociceptive systems are considered, specifically the roles of opioid peptides (enkephalins and endorphins), serotoninergic compounds, and emotional factors in the regulation of pain sensitivity. Consideration is also given to the mechanisms responsible for the analgesic effects of acupuncture, transcutaneous nociceptive stimulation and stressful nociceptive stimulation. I.H.

A85-11585
FREQUENCY OF NONDISJUNCTION OF X-CHROMOSOMES OF FEMALES OF DROSOPHILA MELANOGASTER EXPOSED IN ORBITAL FLIGHT [CHASTOTA NERASKHOZHDENIIA X-KHROMOSOM U SAMOK DROSOPHILA MELANOGASTER, EKSPONIROVANNYKH V ORBITAL'NOM POLETE]
L. P. FILATOVA, E. N. VAULINA, and T. IA. GROZDOVA (Akademiia Nauk SSSR, Institut Obshchei Genetiki, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 277, no. 6, 1984, p. 1479-1481. In Russian. refs

A85-11586
NEURONAL UPTAKE OF H-3-NOREPINEPHRINE BY ISOLATED ORGANS OF RATS DURING HYPERTHERMIA [NEIRONAL'NYI ZAKHVAT 3H-NORADRENALINA IZOLIROVANNYMI ORGANAMI KRYS PRI GIPERTERMII]
KH. A. MEZIDOVA, B. N. MANUKHIN, and F. F. SULTANOV (Akademiia Nauk Turkmenskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Aridnoi Zony, Ashkhabad, Turkmen SSR; Akademiia Nauk SSSR, Institut Biologii Razvitiia, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 277, no. 6, 1984, p. 1502-1504. In Russian. refs

A85-11844
A SYSTEMIC APPROACH TO THE STABILITY AND PLASTICITY OF NEUROPHYSIOLOGICAL PROCESSES IN THE ADAPTIVE BEHAVIOR OF THE BRAIN [SISTEMNYI PODKHOD K USTOICHIVOSTI I PLASTICHNOSTI NEIROFIZIOLOGICHESKIKH PROTSESSOV V KHODE ADAPTIVNOI DEIATEL'NOSTI MOZGA]
N. N. VASILEVSKII (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, July 1984, p. 961-967. In Russian. refs

The problem of stability and plasticity in brain regulatory processes is considered in light of Bekhtereva's theory of the stability of pathological states and of rigid and flexible links in regulating systems. Emphasis is given to the need for a probabilistic approach to the study of bioregulatory mechanisms. The results of a number of previous investigations of the connection between separate biorhythm components in physiological systems and the stability of their functional frequency-amplitude parameters are reviewed. The experimental data are expected to be useful in the development of bioregulatory feedback methods for clinical applications. I.H.

A85-12326
PERSPECTIVES IN CAROTID BODY RESEARCH
C. EYZAGUIRRE (Utah, University, Salt Lake City, UT) and P. ZAPATA (Universidad Catolica de Chile, Santiago, Chile) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 931-957. Research supported by the Universidad Catolica de Chile and Fundacion Gildemeister. refs
(Contract NIH-NS-05666; NIH-NS-07938)

The chemoreceptor mechanism of the carotid body (CB) is discussed in a review of hypotheses and data from recent investigations. The history of CB nomenclature and the problem of the origin of the parenchymal constituents are examined; the vascularization and innervation of the CB are described; the chemoreceptor complex and its response to stimuli are characterized; and pharmacological experiments are surveyed. Consideration is given to the biophysics of cellular activity, nerve-ending activity, synaptic mechanisms, biochemical cellular mechanisms, and efferent control of CB chemoreceptors. The factors which have made it impossible to prove or disprove the validity of any of the main hypotheses are analyzed, and directions for further research are indicated. T.K.

A85-12331
OZONE-INDUCED AIRWAY HYPERACTIVITY IN THE GUINEA PIG
T. GORDON, C. S. VENUGOPALAN, M. O. AMDUR, and J. M. DRAZEN (MIT, Cambridge; Harvard University, Boston, MA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1034-1038. refs
(Contract NIH-R01-01939; NIH-HL-17382; NIH-HL-00549)

A85-12337
EARLY RECOVERY FROM HYPOXIC PULMONARY HYPERTENSION - A STRUCTURAL AND FUNCTIONAL STUDY
R. FRIED (CHildren's Hospital, Boston, MA) and L. M. REID (Harvard University, Boston, MA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1247-1253. refs
(Contract NIH-F32-HL-06304; NIL-HL-23232)

The first month of recovery form 2 wks of hypobaric hypoxia (380 torr) is investigated experimentally in 58 male Sprague-Dawley rats. Parameters measured include pulmonary-artery pressure (Pap), cardiac index, pulmonary vascular resistance, hematocrit, lung volume, the weight ratio of left ventricle and septum to right ventricle, the mean thickness of the intraacinar arteries (MT), the percentage of alveolar-wall-level arteries fully or partially muscular (AW), the extension of muscle to alveolar-duct (AD) and respiratory-bronchiolar arteries, and the index of functional arteries per 100 alveoli (FI). The results are presented in tables and graphs and discussed. Some recovery is observed in all parameters, but full recovery to control levels is achieved only for hematocrit, AW, MT, and FI. Changes in Pap, hematorcrit, AW, and AD are seen within 2 days, but those in the other parameters are more gradual and are interpreted as secondary to the decrease (from 36.6 to 30.1 mm Hg) in Pap. T.K.

A85-12338
ESTIMATION OF RAT THERMOREGULATORY ABILITY BASED ON BODY TEMPERATURE RESPONSE TO HEAT
F. FURUYAMA, K. OHARA, and A. OTA (Nagoya City University, Nagoya, Japan) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1271-1275. refs

N85-10605# Japanese Air Self-Defense Force, Tokyo. Aeromedical Lab.
THE REPORTS OF AEROMEDICAL LABORATORY, VOLUME 25, NO. 1/2
Jun. 1984 85 p refs In ENGLISH and JAPANESE
(ISSN-0023-2858) Avail: NTIS HC A05/MF A01

The flying situations which induce emotional disturbances in pilots were determined. The effects of weight training on acceleration tolerance were evaluated. Psychological uneasiness and phobic tendencies in aircraft pilots were assessed. The inflating characteristics of an anti-G pressure suit for pilots were studied. The fatigue of air traffic controllers and other persons working shiftwork was measured.

N85-10611# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 18, NO. 4, JULY - AUGUST 1984
O. G. GAZENKO, ed. 2 Oct. 1984 143 p refs Transl. into ENGLISH of Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984
(JPRS-USB-84-006) Avail: NTIS HC A07

News items, abstracts and articles from scientific reports on aspects of space biology and aerospace medicine are covered including the role of deconditioning of resistive vessels; effects of weightlessness; computer techniques; hemodynamics; hyperoxia; hypokinesia; lipid metabolism; muscular functions; toxicology; long term space flight; and bone demineralization.

N85-10612# Joint Publications Research Service, Arlington, Va.
CIRCULATORY ORTHOSTATIC INSTABILITY: ROLE OF DECONDITIONING OF RESISTIVE VESSELS
V. M. KHAYUTIN, S. M. SHENDEROV, A. G. ZAKHAROV, and A. N. ROGOZA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 1-11 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 4-12
Avail: NTIS HC A07

One of the effects of weightlessness on the circulatory system, i.e., reduction of the tension distending resistance vessels due to the loss of hydrostatic pressure, was simulated. For this purpose the abdominal aorta of rats was constricted by a wire spiral. As a result, the arterial pressure in the posterior body decreased by 30 to 50%. Beginning with postoperation day 7 the hydraulic resistance of resistance vessels of hindlimbs was decreased progressively and the myogenic regulation of their lumen was inhibited. The response to the stimulation of vasoconstrictive fibers of the sciatic nerve that was reduced 7 to 14 days after operation returned to normal 90 days later. An examination of the tail arteries demonstrated that the ability of their muscular layer to withstand the distending effect of the physiologically normal pressure was impaired. The magnitude of the constrictor reaction to norepinephrine (particularly to its moderate concentrations) was lowered. These changes may play an important role in the orthostatic disorders of circulation that occur after exposure to weightlessness. Author

N85-10613# Joint Publications Research Service, Arlington, Va.
HEMOPOIESIS IN RATS SUBMITTED TO WEIGHTLESSNESS
V. N. SHVETS, A. VACEK, G. I. KOZINETS, I. I. BRITVAN, V. I. KOROLKOV, and N. A. CHELNAYA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 12-17 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 12-16
Avail: NTIS HC A07

Experimental data on the erythropoiesis of rats flown on Cosmos biosatellites for 18 to 22 days are summarized. The histogenesis of the hemopoietic tissue is investigated at the level of stem cells, dividing maturing pool and mature blood cells (erythrocytes). In weightlessness inhibition of the erythropoiesis in various skeletal sites occurs. Flight data are compared with hemopoietic findings in hypokinetic rats. Possible mechanisms underlying red blood disorders in humans during spaceflight are discussed. Author

N85-10619# Joint Publications Research Service, Arlington, Va.
FREQUENCY AND NATURE OF ELECTROCARDIOGRAPHIC DISTURBANCES IN DOGS DURING SINGLE AND REPEATED EXPOSURE TO +G SUB Z ACCELERATIONS
R. A. VARTBARONOV, G. D. GLOD, N. N. UGLOVA, M. N. KHOMENKO, and I. S. ROLIK *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 50-55 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 37-41
Avail: NTIS HC A07

Pathological changes of the ECG were examined in 10 adult dogs exposed to +G(z) once a day or 3 times a week for three days a week during 2 to 12 weeks. In response to acceleration all of the dogs developed ECG changes. The frequency and level of these disorders were dependent on the acceleration magnitude and the health state that varied during repeated exposure. These findings were used to develop a 5-score scale for measuring ECG disorders and to identify phase changes in acceleration tolerance during repeated exposure to +G(z). It was also demonstrated that animals can be specifically trained to tolerate sustained and high acceleration +G(z). Author

N85-10620# Joint Publications Research Service, Arlington, Va.
EFFECT OF SPACEFLIGHT FACTORS ON RAT BONE MARROW CELLS
D. K. BENOVA, A. K. BAIRAKOVA, I. V. BAEV, and H. G. NIKOLOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 56-59 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 41-43
Avail: NTIS HC A07

The effect of spaceflight factors, weightlessness in particular, on the genetic structures of bone marrow cells of rats flown for 18.5 days on Cosmos-1129 was investigated. Chromosome aberrations were measured on postflight days 6 and 25. The frequency of unstable chromosome aberrations was similar in the flight, synchronous and vivarium rats. Karyotyping of metaphase plates revealed chromosome aberrations in the flight and synchronous rats. Exposure to weightlessness did not influence the mutagenic effect in bone marrow cells of the rats. Author

N85-10621# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF MORPHOLOGICAL CHANGES IN ARTICULATION NERVOUS SYSTEM UNDER HYPOKINETIC CONDITIONS AS A MODEL OF A SPACEFLIGHT FACTOR
V. I. DROBYSHEV, V. V. ANTIPOV, and V. V. MAKAROV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 60-68 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 43-49
Avail: NTIS HC A07

Using statistical treatment, a neuromorphological examination of the joint capsule of rats exposed to hypokinesia for 7, 15, 20, 30, 40 and 60 days was carried out. The exposure to 7 days caused an increase in the number of reactively changed nerve fibers and receptors. The exposure to 15 days resulted in a significant increase of the number of nerve fibers with destructive changes that involved mostly large-caliber fibers. However, 20- and, especially, 30-day hypokinesia was followed by a significant reduction of destructive changes. After 40- and 60-day exposure they again became very distinct. This suggested a wave-like pattern of structural changes. At every stage of experimental hypokinesia all the compartments of the joint nervous apparatus showed adaptive-compensatory reactions. Author

N85-10622# Joint Publications Research Service, Arlington, Va.
EFFECT OF 1,25-DIHYDROXYCHOLECALCIFEROL AND 24,25 DIHYDROXYCHOLECALCIFEROL ON GROWTH AND ALTERATION OF RAT BONES DURING HYPOKINESA (HISTOMORPHOMETRIC STUDY)
O. Y. KABITSKAYA, Z. F. SAVIK, A. S. KAPLANSKIY, V. N. SHVETS, I. N. SERGEYEV, M. S. BELAKOVSKIY, and V. B. SPIRICHEV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 69-76 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 49-55
Avail: NTIS HC A07

The tubular bones of the fore- and hindlimbs of rats immobilized for five weeks were examined morphometrically and histologically. The rats were regularly given per os 1,25(OH2D3, 24,25(OH)2D3 or their combinataion. The uptake of 24,25(OH)2D3 at a dose of 1.25 milligrams or a combination of 1,25(OH)2D3 and 24,25(OH)2D3 at a dose of 0.03 + 0.25 milligrams led to the recovery of the linear and volume-weight rates of bone formation that changed during hypokinesia. However, these D3 metabolites did not restore the width of the epiphseal growth plate, whereas the size of the primary and secondary spongiosa returned to normal or exceeded in in response to 24,25(OH)2D3 at a dose of 1.25 milligrams and 1,25(OH)2D3 at a dose of 0.15 milligrams, respectively (only these two doses were used); in other words, the D3 metabolites prevented osteoporosis which is typical of hypokinesia. It is assumed that hypokinesia may produce either disorders in D3 metabolism or changes in the sensitivity of bone cells to active D3 metabolites and other hormones that are directly or indirectly involved in osteogenesis regulation. Author

N85-10623# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF SOME PARAMETERS OF CARBOHYDRATE AND LIPID METABOLISM IN RECOVERY PERIOD FOLLOWING LONG-TERM HYPOKINESA
T. M. LOBOVA, P. P. POTAPOV, and A. V. CHERNYY *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 77-81 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 55-58
Avail: NTIS HC A07

Eighty-seven white rats were exposed to prolonged hypokinesia. On the 90th hypokinesia day the content of cholesterol, free fatty acids and acetone bodies increased and the content of sugar and triglycerides decreased in blood, the content of glycogen decreased and the content of cholesterol increased in liver and skeletal muscles. On the 15th day after exposure most parameters returned to normal. However, glucose-6-phosphate dehydrogenase in liver and adipose tissue increased and remained elevated till recovery day 60. On the 30th recovery day the changes were similar to those during hypokinesia. On the 90th recovery day the content of triglycerides, cholesterol and acetone bodies in blood grew and the content of triglycerides and glycogen in muscles increased. Author

N85-10624# Joint Publications Research Service, Arlington, Va.
BILIGENIC FUNCTION OF WHITE RAT LIVER
Y. N. PANASYUK and L. N. SKAKUN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 82-88 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 58-62
Avail: NTIS HC A07

White male rats were exposed to hypokinesia of 4 to 30 days in duration. The exposure led to a moderate hypersecretion of gall which was more distinct in autumn and winter. The synthesis and secretion of gallic acid increased. The excretion of cholesterol also grew. The ratio of tauro- and glycoacids shifted in favor of the latter. The cholate cholesterol coefficient increased. These changes in gall formation during hypokinesia are closely related to disorders in lipid and carbohydrate metabolism, as well as in adrenal function. Author

N85-10625# Joint Publications Research Service, Arlington, Va.
EFFECT OF SHORT-TERM HYPOKINESIA ON RAT OPIOID SYSTEM REACTION
R. A. TIGRANYAN, O. P. VAKULINA, and L. F. PANCHENKO *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 89-93 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 63-66
Avail: NTIS HC A07

The content of methionine-enkephalin, leucine-enkephalin and beta-endorphine was measured in various brain compartments (hypophysis, hypothalamus, midbrain, medulla oblongata, striatum), the adrenals, and blood plasma of the rats exposed to single and repeated immobilization. The reaction of the opiate systems to hypokinesia was very distinct in the emotiogenic brain structures (hypothalamus and midbrain) and hypophysis. The content of opiate-like peptides varied as a function of the immobilization time, with the most distinct changes occurring at the 150th minute. After daily immobilization was repeated 40 times, adaptation to the chronic stress effect developed. Author

N85-10632*# National Aeronautics and Space Administration, Washington, D. C.
FUNGI OF MT. BABIA GORA. 2: INDICATIVE VALUE OF MACROMYCETES IN FOREST ASSOCIATIONS. A: INITIAL CONSIDERATIONS
A. BUJAKIEWICZ Jun. 1984 83 p refs Transl. into ENGLISH from Acta Mycol. (Poland), v. 17, nos. 1-2, 1981 p 63-125 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASW-3541)
(NASA-TM-77485; NAS 1.15:77485) Avail: NTIS HC A05/MF A01 CSCL 06C

The role and value of fungi in forest associations of Mt. Babia Gora massif were determined. The general physiographic characteristics of the research terrain, the distribution of the fungi sites, a list of the 618 taxons noted in the subalpine forests of Mt. Babia Gora, and the initial characteristics of the forest mycoflora of this massif are presented. R.S.F.

N85-10633*# National Aeronautics and Space Administration, Washington, D. C.
FUNGI OF MOUNT BABIA GORA. 3: THE INDICATING VALUE OF MACROMYCETES IN THE FOREST ASSOCIATIONS
A. BUJAKIEWICZ May 1984 63 p refs Transl. into ENGLISH from Acta Mcyol. (Poland), v. 18, no. 1, 1982 p 3-44 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(NASA-TM-77486; NAS 1.15:77486) Avail: NTIS HC A04/MF A01 CSCL 06C

The results of a mycological investigation of the forests of the upper mountain forest zone of Mt. Babia Gora and the synthetic characteristics of participation of macromycetes in all the forests studied are presented. Regularities and distinct connections were found in the occurrence of macromycetes on the background of various forest associations, differences in exposure, orography, climate, and changes induced by man. Author

N85-10634# Systems Research Labs., Inc., Dayton, Ohio.
PRIMATE EQUILIBRIUM PERFORMANCE AND DIAZEPAM: A BEHAVIORAL TOLERANCE EFFECT Final Technical Paper, Jan. - Aug. 1983
D. W. BLICK, C. T. BENNETT, and M. R. MURPHY Jul. 1984 10 p
(Contract F33615-80-C-0603)
(AD-A145156; USAFSAM-TP-84-286) Avail: NTIS HC A02/MF A01 CSCL 06O

Well-trained rhesus macaques were tested for their ability to perform a compensatory tracking task (Primate Equilibrium Platform) under the influence of diazepam. Performance decrements were observed that depended not only on the dose, but also on the amount of prior experience of the animal with the drug. Such tolerance effects make it inappropriate to use repeated measures designs to derive dose-effects functions for performance. The impact of tolerance effects on the measurement and interpretation of drug-induced performance decrements was discussed. Author (GRA)

N85-10635# Department of the Air Force, Washington, D.C.
IN VIVO DERMAL ABSORPTION METHOD AND SYSTEM FOR LABORATORY ANIMALS Patent Application
J. N. MCDOUGAL, inventor (to Air Force) 22 May 1984 17 p
(AD-D011231; US-PATENT-APPL-SN-612776) Avail: NTIS HC A02/MF A01 CSCL 14B

A method and system is described for in vivo dermal absorption testing of a laboratory animal uses a mask and harness for protecting the respiratory tract of the animal when the animal is housed within a sealed chamber with a hazardous test vapor introduced in the chamber. Because of the difficulty of getting a good seal with a protective mask on a laboratory animal, this system is designed with an air leak from inside the mask into the chamber. To ensure that the test vapor does not infiltrate the mask nor leak from the chamber, the vapor is maintained at a negative pressure within the chamber as compared to the external atmospheric pressure and air is supplied to the mask for the animal to breathe at a positive pressure and a greater rate than that needed by the animal. GRA

N85-10787# Joint Publications Research Service, Arlington, Va.
LAGGING DEVELOPMENT OF BIOTECHNOLOGY DESCRIBED
B. KASTORY *In its* East Europe Rept.: Sci. and Technol. (JPRS-ESA-84-029) p 30-35 3 Aug. 1984 Transl. into ENGLISH from Zycie Warszawy (Warsaw), no. 4, 8 May 1984 p 3
Avail: NTIS HC A03/MF A01

Poland's lagging development of biotechnology is described. Areas in which research could be best utilized include the pharmaceutical industry, chemical engineering and water pollution. Reasons are cited for this lag in development. B.W.

N85-11074# Joint Publications Research Service, Arlington, Va.
COMMENTARY ON DERIVATION OF BIOLOGICAL MATERIALS, COSMONAUT ADAPTATION Abstract Only
A. IVAKHNOV *In its* USSR Rept.: Space (JPRS-USP-84-005) p 28-29 26 Oct. 1984 Transl. into ENGLISH from Izv. (Moscow), 22 Jul. 1984 p 3
Avail: NTIS HC A07

The latest series of medical and biological experiments which were scheduled for performance on board the orbiting station 'Salyut-7' are discussed. The progress of experiments for obtaining superpure substances have convinced specialists that it is both possible and economically advantageous to obtain, in space, superpure biological preparations in quantities sufficient for practical employment in public health and agriculture. An extrapure antiserum which is now being used as a standard in the production of standard vaccines was manufactured with the aid of a spaceborne preparation. This preparation was obtained from the membrane of the influenza virus. A small portion of this substance will be used to obtain so called diagnosticums for the routine determination of viral strains that cause epidemics at particular times. Work aimed at isolating microorganisms which are efficient producers of fodder antibiotics, and at obtaining certain medical preparations which

are free of undesirable impurities is being performanced. A valuable medicinal protein is to be refined from a preparation obtained on Earth by a genetic engineering method. Author

N85-11520*# Arizona Univ., Tucson. Dept. of Biochemistry.
SKELETAL MUSCLE METABOLISM IN HYPOKINETIC RATS Semiannual Progress Report, 1 Apr. - 30 Sep. 1984
M. E. TISCHLER 1984 5 p refs
(Contract NAGW-227)
(NASA-CR-174059; NAS 1.26:174059) Avail: NTIS HC A02/MF A01 CSCL 06C

Muscle growth, protein metabolism, and amino acid metabolism were studied in various groups of rats. Certain groups were adrenaliectomized; some rats were suspended while others (the controls) were weight bearing. Results show that: (1) metabolic changes in the extensor digitorum longus muscle of suspended rats are due primarily to increased circulating glucocorticoids; (2) metabolic changes in the soleus muscle due to higher steroid levels are probably potentiated by greater numbers of steroid receptors; and (3) not all metabolic responses of the soleus muscle to unloading are due to the elevated levels of glucocorticoids or the increased sensitivity of this muscle to these hormones. R.S.F.

N85-11521*# Research Triangle Inst., Research Triangle Park, N.C.
APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOLOGY AND MEDICINE Final Report
B. BASS, H. C. BEALL, J. N. BROWN, JR., W. H. CLINGMAN, R. E. EAKES, P. N. KIZAKEVICH, M. MCCARTNEY, and D. J. ROUSE Apr. 1982 132 p
(Contract NAS1-16177)
(NASA-CR-165872; NAS 1.26:165872) Avail: NTIS HC A07/MF A01 CSCL 06B

Utilization of National Aeronautics and Space Administration (NASA) technology in medicine is discussed. The objective is best obtained by stimulation of the introduction of new or improved commercially available medical products incorporating aerospace technology. A bipolar donor/recipient model of medical technology transfer is presented to provide a basis for the team's methodology. That methodology is designed to: (1) identify medical problems and NASA technology that, in combination, constitute opportunities for successful medical products; (2) obtain the early participation of industry in the transfer process; and (3) obtain acceptance by the medical community of new medical products based on NASA technology. Two commercial transfers were completed: the Stowaway, a lightweight wheelchair that provides mobility for the disabled and elderly in the cabin of commercial aircraft, and Micromed, a portable medication infusion pump for the reliable, continuous infusion of medications such as heparin or insulin. The marketing and manufacturing factors critical to the commercialization of the lightweight walker incorporating composite materials were studied. Progress was made in the development and commercialization of each of the 18 currently active projects. E.A.K.

N85-11522*# National Aeronautics and Space Administration, Washington, D. C.
FUNGI OF MT. BABIA GORA. 1: MYCOFLORA OF FORESTS
A. BUJAKIEWICZ May 1984 127 p Transl. into ENGLISH from Acta Mycol. (Poland), v. 15, no. 2, 1979 p 213-294 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASW-3541)
(NASA-TM-77484; NAS 1.15:77484) Avail: NTIS HC A07/MF A01 CSCL 06C

A list of 617 taxons of fungi (macromycetes) recorded in the forests of the Mt. Babia Gora in the Western Carpathians is presented. M.A.C.

N85-11523*# Houston Univ., Tex.
PHYLOGENIC DISTRIBUTION OF THE LARGE 55 RRNA FROM HALOCOCCUS MORRHUAE Progress Report
1984 30 p refs
(Contract NSG-7440)
(NASA-CR-174019; NAS 1.26:174019) Avail: NTIS HC A03/MF A01 CSCL 06C

Sequence characterizations of bacterial ribonucleic acids are discussed. The phylogeny of various bacterial strains based upon RNA data is presented. R.S.F.

N85-11524# Naval Aerospace Medical Research Lab., Pensacola, Fla.
SPECIFIC ABSORPTION RATE IN A SITTING RHESUS MODEL AT 225, 1290, AND 5950 MHZ FOR E, H, AND K POLARIZATIONS Interim Report
T. A. GRINER and R. G. OLSEN 23 Apr. 1984 17 p
(AD-A145435; NAMRL-1308) Avail: NTIS HC A02/MF A01 CSCL 06R

Previous radio-frequency dosimetry studies of the E-polarized sitting rhesus model have shown higher specific absorption rates (SAR) than predicted by theoretical estimates based on a prolate spheroidal model. It was postulated that partial-body resonances tended to enhance the wholebody absorption. The purpose of this study was to further investigate the effects of enhanced whole-body SARs for three primary orthogonal orientations at three widely spaced irradiation frequencies. Author (GRA)

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

A85-10422
THE ELECTRICAL STIMULATION OF A VESTIBULAR ANALYZER DURING THE PHOTOELECTRIC RECORDING OF EYE MOVEMENTS [ELEKTRICHESKAIA SFIMULIATSIA VESTIBULIARNOGO ANALIZATORA V USLOVIIAKH FOTOELEKTRICHESKOI REGISTRATSII DVIZHENII GLAZ]
S. N. KHECHINASHVILI, B. M. ZARGARIAN, and K. G. KARAKOZOV (Ministerstvo Zdravookhraneniia SSSR, Institut Usovershenstvovaniia Vrachei, Tbilisi, Georgian SSR) Vestnik Otorinolaringologii (ISSN 0042-4668), Sept.-Oct. 1984, p. 3-7. In Russian. refs

Electrostimulators and electronystagmographs are used for clinical studies of the effectiveness of vestibular analyzers. In experiments with a VV-II analyzer, the linearity of the nystagmus parameters determined by the analyzer corresponded to a range of eye movements from 0.5 to 8 degrees. The use of infrared light has made it possible to conduct experiments in complete darkness. It is found that tightly-bound fibers in the device completely eliminated the caloric effects of infrared radiation in the eye. The most important characteristics of the galvanic nystagmus are found to be the rate of the slow phase and frequency. I.H.

A85-10423
THE CLASSIFICATION OF VESTIBULAR NYSTAGMUS [O KLASSIFIKATSII VESTIBULIARNOGO NISTAGMA]
V. T. PALCHUN and V. I. GRINCHUK (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Vestnik Otorinolaringologii (ISSN 0042-4668), Sept.-Oct. 1984, p. 14-17. In Russian. refs

A classification for different types of vestibular nystagmus (VN) is proposed on the basis of several clinical and experimental studies of the development of labyrinthine and retrolabyrinthine vestibular disorders. The classification scheme is divided into three groups according to the spontaneous, provocative, or experimental factors

inducing VN. The provocative nystagmus group includes two subgroups: primary labyrinthine nystagmus and vascular nystagmus. The experimental group consists of rotatory, caloric, and galvanic nystagmus. It is found that the classification of nystagmus in this way makes it possible to develop an optimal scheme for studying vestibular functions by electronystagmography, and to determine the degree of compensation for lost vestibular function. I.H.

A85-10726
CENTRAL HEMODYNAMICS DURING ZERO GRAVITY SIMULATED BY HEAD-DOWN BEDREST
H. LOELLGEN (St. Vincenz Hospital, Limburg; Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Cologne, West Germany), U. GEBHARDT, J. BEIER, J. HORDINSKY, H. BORGER, V. SARRASCH, and K. E. KLEIN (Deutsche Forschungsund Versuchsanstalt fuer Luft- und Raumfahrt, Institut fuer Flugmedizin, Cologne, West Germany) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 887-892. refs

Central hemodynamics during head-down tilt of -6 deg lasting for 2 h were studied using catheterization of the pulmonary artery. M-mode echocardiography was performed simultaneously. Significant increases occurred for pressures in the right atrium, pulmonary artery in pulmonary wedge position, and for pulmonary vascular resistance. Cardiac and stroke volume index, heart rate, mean arterial pressure, and total systemic resistance remained constant throughout the exposure time. Constancy was also observed for echocardiographic measures of cardiac dimensions. It is concluded that head-down tilt leads to an increase of preload without any evidence of disturbed left ventricular function. No distinct time course of hemodynamic variables could be seen. Echocardiography proved a useful method to study cardiovascular adaptations during head-down tilting. Author

A85-10727
SEX DIFFERENCES IN TRANSTHORACIC IMPEDANCE - EVALUATION OF EFFECTS ON CALCULATED STROKE VOLUME INDEX
M. E. MCKINNEY, J. C. BUELL, and R. S. ELIOT (Nebraska, University, Medical Center, Omaha, NE) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 893-895. refs

Transthoracic impedance (Zo) is the impedance offered by the human thoracic cavity to the flow of an electrical signal. It is used as a factor in a formula for the calculation of the stroke volume (SV). It was suggested that sex-related differences in Zo, with women showing higher values, might cause underestimation of SV in women. The present investigation is concerned with an examination of men and women to determine if Zo levels differed in both the seated position and in the supine position, which would increase venous return and raise central blood volume, perhaps unequally across sexes. It was found that, while women do have higher Zo levels, impedance cardiography does not underestimate SV levels in women. This result is obtained because of the higher dZ/dt also observed in women. The reasons for sex differences in Zo are considered. G.R.

A85-10729
TOLERANCE OF THE HUMAN CERVICAL SPINE TO HIGH ACCELERATION - A MODELLING APPROACH
C. HELLEUR, S. GRACOVETSKY, and H. FARFAN (Concordia University, Montreal, Canada) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 903-909. refs
(Contract AF-AFOSR-81-0012)

A sagittal plane mathematical model for the cervical spine has been used to simulate the neck's response to loads due to high acceleration. The model is capable of simulating the muscular response of the cervical spine and the stress distribution between the joint levels. In order to obtain conservative estimates of the maximum acceleration that the neck can support, the neck was simulated using the assumption that the inertial load is supported primarily by the muscles. It was found that accelerations of up to 30 g can be supported with the appropriate posture and direction of acceleration. Estimates were also obtained using experimental results to approximate the role that the ligaments of the spine play in supporting the load. It was found that accelerations of up to 40 g can be supported for the appropriate posture and acceleration direction. Author

A85-10731
STEREOSCOPIC CEREBRAL EVOKED POTENTIALS OF AIR FORCE PILOTS AND CIVILIAN COMPARISON GROUPS
B. FENELON, R. A. NEILL, and M. MANNING (Newcastle, University, Newcastle, Australia) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 914-920. Sponsorship: National Health and Medical Research Council. refs
(Contract NHMRC-80/4265)

Dynamic random-dot stereograms were presented to Air Force jet pilots (N = 14) through a new visual display system. Games which simulated target-detection exercises were included in the test sequence. Event-related potentials were recorded at scalp sites 01, 02, T5, T6, referenced to an anterior midline site. Comparisons were made where possible with the data from recent studies on three civilian groups. A pattern of response was revealed in the event-related potential measures. In general, left-hemisphere amplitudes exceeded right and the predominant response was recorded at the left-temporal site. Amplitudes of responses in subjects able to describe the stimuli in subjective report (perceivers) exceeded those of non-perceivers. Stimuli with definite boundaries evoked stronger and earlier-latency responses than stimuli with nebulous boundaries. The response patterns of subjects make a contribution to normative data on the cerebral electrical indices of stereoscopic vision. Author

A85-10732
CENTRAL NERVOUS REACTIONS TO A 6.5-HOUR ALTITUDE EXPOSURE AT 3048 METERS
R. J. VAERNES (Bergen, Universitetet, Bergen; Norwegian Underwater Technology Centre, Norway), J. O. OWE (Institute of Aviation Medicine, Oslo, Norway), and O. MYKING (Haukeland Hospital, Bergen, Norway) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 921-926. refs

Attention is given to the effects of mild hypoxia on performance in an aircrew required to maintain peak performance for hours while performing monotonous tasks under hypobaric conditions. It is found that earlier studies have produced some contradictory evidence. An investigation is, therefore, conducted to examine the effects of a prolonged exposure to mild hypoxia on performance and endocrine reactivity. An altitude of 3048 m is simulated in an altitude chamber for 6.5 h. Seven subjects participated in the study, including one female and six males. On the basis of the obtained results, it is concluded that staying at 3048 m for more than 6.5 h after rapid decompression causes significant effects of hypoxia. G.R.

A85-10734
PHYSIOLOGICAL AND PERCEPTUAL RESPONSES TO CYCLIC HEAT STRESS VARIATIONS
P. H. MAIRIAUX (Louvain, UniversiteCatholique, Louvain-la-Neuve, Belgium; CNRS, Centre d'Etudes Bioclimatiques, Strasbourg, France), J. P. LIBERT, V. CANDAS, and J. J. VOGT (CNRS, Centre d'Etudes Bioclimatiques, Strasbourg, France) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 935-940. Sponsorship: European Coal and Steel Community. refs
(Contract ECSC-7245/35/2/003)

The present investigation has two objectives. The first is related to an examination of the effects of the period of a heating-cooling schedule on the strain perceived by the subject, while the second is concerned with the relationships between the perceptual and physiological responses. The subjects used in the experiments included five healthy unacclimated male students. All experiments were conducted in a climatic chamber. Under the conditions investigated, the subjects marked a clear preference for the heating-cooling cycle with the shortest period duration. The results

of the investigation showed that, under intermittent exposure to dry heat, the period duration of the heat-cooling cycle can affect the subject's perceived strain through an increased sweat accumulation in some skin areas, even in the absence of any sweat drippage. Under such conditions, perceptual criteria would offer a useful means of discriminating slight differences in strain. G.R.

A85-10737
THE EFFECTS OF SPECTACLE FRAMES ON FIELD OF VISION
J. R. DILLE and J. A. MARANO (FAA, Civil Aeromedical Institute, Oklahoma City, OK; U.S. Navy, Optometry Clinic, Alameda, CA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 957-959.

A85-10739
THE 1980 AND 1981 ACCIDENT EXPERIENCE OF CIVIL AIRMEN WITH SELECTED VISUAL PATHOLOGY
J. R. DILLE and C. F. BOOZE, JR. (FAA, Civil Aeromedical Institute, Oklahoma City, OK) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 966-969. refs

A85-11001
HIGH ALTITUDE AND MAN
J. B. WEST, ED. (California, University, La Jolla, CA) and S. LAHIRI, ED. (Pennsylvania, University, Philadelphia, PA) Bethesda, MD, American Physiological Society, 1984, 206 p. For individual items see A85-11002 to A85-11017.

Consideration is given to a number of investigations of the physiological effects of high altitude, including the general physiological condition of climbers on Mt. Everest; hypoxic ventilatory response and exercise ventilation; human cerebral function at extreme altitude; and metabolic and endocrine changes at high altitude. Among the other topics discussed are: the effect of altitude on the renin aldosterone system; red-cell formation at high altitude; sleep and periodic breathing at high altitude in Sherpas and visitors; ventilatory control during sleep in normal humans at high altitude; hypoxia and blood flow; and hypoxic versus hypocapnic effects on periodic breathing during sleep. Consideration is also given to the effects of acclimatization on sleep hypoxia at high altitude; respiratory control in Andean and Himalyan high altitude natives; ventilatory function in the adaptation to high altitude; and ventilation in human populations native to high altitude living. I.H.

A85-11002
MAN ON THE SUMMIT OF MOUNT EVEREST
J. B. WEST (California, University, La Jolla, CA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 5-17. Research supported by the American Alpine Club, American Lung Association, National Geographic Society, Servier Laboratories, Explorers Club, U.S. Army, and NSF. refs
(Contract PHS-R01-HL-24335; NIH-N01-HR-2915)

A number of experimental results from physiological investigations conducted during the American Medical Research Expedition to Mt. Everest (AMREE) are summarized, with reference to theoretical models of human physiology at extreme altitudes and to existing experimental data. The methodology and instruments used during the expedition for measuring barometic pressure, alveolar gas composition, partial pressure of arterial oxygen, acid-base status, and oxygen uptake are described. It is found that the subjects of the study performed better than was predicted in a pre-expedition theoretical analysis. The improved performance is explained by three factors: (1) the barometric pressure on the summit (8,848 m) was higher than predicted; (2) the base excess of the subjects was higher than predicted; and (3) the level of hyperventilation was much higher than expected. A series of graphs is presented which describe the effects of the altitude induced hypoxemia in detail. I.H.

A85-11003
HYPOXIC VENTILATORY RESPONSE AND EXERCISE VENTILATION AT SEA LEVEL AND HIGH ALTITUDE
R. B. SCHOENE (Washington, University, Seattle, WA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 19-30. refs

The results of an experiment conducted on Mt. Everest to investigate the relationship between hypoxic ventilatory response (HVR) and exercise performance at sea level and high altitude are reported. Examinations were made of HVR in natives of high altitude and in a group of mountain climbers in the course of the American Medical Research Expedition to Mt. Everest (AMREE). Specific attention was given to the association of blunted HVR with outstanding endurance athletes, and to the association of normal to high HVR with performance at high altitude. It is shown statistically that HVR correlates well with the response to altitude after acclimatization is useful in predicting exercise ventilation at sea level, protects oxygen saturation during exercise, and may be useful in predicting adaptation and performance at extreme altitude. Arterial oxygen saturation during exercise at high altitude was only partially explained by ventilation. I.H.

A85-11004
HUMAN CEREBRAL FUNCTION AT EXTREME ALTITUDE
B. D. TOWNES, T. F. HORNBEIN, R. B. SCHOENE, F. H. SARNQUIST, and I. GRANT (Washington, University, Seattle, WA; Stanford University, Medical Center, Stanford; U.S. Veterans Administration, San Diego; California, University, Medical Center, La Jolla, CA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 31-36. Research supported by the National Geographic Society and U.S. Army. refs
(Contract NIH-HC-00906)

The results of an investigation of the effects of high altitude on long-term cognition and behavior in 21 members of the American Medical Research Expedition to Mt. Everest (AMREE) are reported. Psychological tests were administered before, during, and one year after the expedition. Both transient and long term neurobehavioral effects were found after exposure to the extreme hypoxemia of the high altitude environment. Transient effects included a mild deterioration in the learning, memory, and expression of verbal material. These impairments were present within three days of descent into Katmandu but not one year following the expedition. A bilateral reduction in motor speed characterized by rapid muscle fatigue persisted one year after the expedition. The full results of the study are summarized in a table. I.H.

A85-11005
METABOLIC AND ENDOCRINE CHANGES AT ALTITUDE
F. D. BLUME (California State College, Bakersfield, CA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 37-45. refs

The effects of prolonged exposure to high and extremely high altitude (more than 5,000 m) on metabolic and endocrine levels are investigated, as part of the 1981 American Medical Research Expedition to Mt. Everest (AMREE). The study consisted of measurements of metabolic and endocrine levels in fourteen males between the ages of 28 and 52 at sea level and again at altitudes of 5,400 and 6,300 m. The similarities and differences between data from previous studies and the results for extreme altitude are discussed. It is found that the duration and level of high-altitude exposure can cause a number of varied effects on body metabolism including weight loss, water loss, and changes in the levels of pancreatic and thyroid hormones. As acclimatization occurs, the metabolic changes are lessened or disappear altogether. It is suggested that the significant losses of body fat and protein stores observed in the test subjects represent the utilization of these materials to meet the increased energy demands of the high altitude environment. I.H.

A85-11006
RENIN-ALDOSTERONE SYSTEM
J. S. MILLEDGE (Medical Research Council, Clinical Research Center, Harrow, England) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 47-57. refs

The results of a physiological investigation of the effects of continuous exercise on fluid retention are presented. A series of experiments were performed in order to determine whether moderate exercise induced hypoxia inhibited angiotensin-converting enzyme (ACE) activity in humans, and whether inhibited ACE activity would alter the relationship between plasma renin activity (PRA) and plasma aldosterone concentration (PAC). In the laboratory phase of the study, hypoxia was induced by breathing an air mixture of 12.8 percent oxygen during light exercise. Field experiments were conducted on mountains in Switzerland and China, at different altitudes between 900 and 4500 m for long and short periods of time. PAC was measured in samples of saliva, urine, and blood. The complete results for both the laboratory and field experiments are summarized in a series of tables. It is found that if the main renin-aldosterone system is stimulated for several hours by exercise at low or high altitude, a significant amount of sodium is retained and this may be a factor in the genesis of acute mountain sickness and High Altitude Pulmonary Edema (HAPE). Hypoxia is found to be synergistic to exercise in stimulating renin production, and the reaction to increased renin in the body is the production of aldosterone and angiotensin II, which is also considered a factor in HAPE and strokes at high altitude. I.H.

A85-11007
RED CELL FUNCTION AT EXTREME ALTITUDE
R. M. WINSLOW (U.S. Public Health Service, Center for Infectious Diseases, Atlanta, GA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 59-72. refs

The results of a series of experiments investigating the effects of extremely high altitude of hemoglobin structure and function are presented. A number of measurements of the important red blood cell parameters (hemoglobin concentration, blood pH, hematocrit percentage, and mean corpuscular hemoglobin concentration) were made from blood samples taken from 1-20 mountaineers at altitudes ranging from sea level in San Diego, CA, to the summit of Mt. Everest (about 9000 m). The hematological data obtained from the measurements are presented in the form of a curve representing the statistical relationship between the amount of blood oxygen bound to hemoglobin and the amount of oxygen physically dissolved in solution under equilibrium conditions. It is found that the oxygen equilibrium of humans at sea-level can be maintained at high altitudes and that it may be possible to blunt the effects of high altitude hypoxia through the use of drugs. I.H.

A85-11008
SLEEP AND PERIODIC BREATHING AT HIGH ALTITUDE - SHERPA NATIVES VERSUS SOJOURNERS
S. LAHIRI, K. H. MARET, M. G. SHERPA, and R. M. PETERS, JR. (Pennsylvania, University, Philadelphia, PA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 73-90. refs
(Contract NIH-HL-26533; NIH-HL-24335; NIH-HL-08899)

A physiological experiment investigating the causes of periodic breathing (Cheyne-Stokes breathing) in Sherpa natives at high altitudes is described. A general model for the genesis of period breathing is proposed which takes into account the effects of hypoxemia, respiratory alkalosis, increased oscillations of alveolar gases, and increased central carbon dioxide sensitivity. Respiratory studies during sleep were carried out on adult male volunteers at the Base Camp Laboratory of the American Medical Research Expedition to Mt. Everest. Measurements were made of oxygen ventilation arterial oxygen saturation, and heart rate in both sleeping and waking states. The data obtained for the Sherpa subjects were compared with similar data obtained for non-native members of the expedition. Several of the important results are discussed in reference to the general model. I.H.

A85-11009
VENTILATORY CONTROL DURING SLEEP IN NORMAL HUMANS
J. V. WEIL, D. P. WHITE, N. J. DOUGLAS, and C. W. ZWILLICH (Colorado, University, Denver, CO) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 91-100. refs

Some aspects of ventilatory control in normal humans during sleep are discussed with reference to a number of experimental investigations. Among the topics addressed are: hypercapnic ventilatory response during sleep; hypoxic ventilatory supply during sleep; sex differences in ventilatory control during sleep and wakefulness; and metabolic rate changes during sleep. The potential effects of high altitude on these processes is briefly examined. I.H.

A85-11011
HYPOXIC VERSUS HYPOCAPNIC EFFECTS ON PERIODIC BREATHING DURING SLEEP
A. BERSSENBRUGGE, J. DEMPSEY, and J. SKATRUD (Wisconsin, University; William S. Middleton Memorial Veterans Administration Hospital, Madison, WI) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 115-127. Research supported by the U.S. Veterans Administration. refs
(Contract DAMD17-77-C-7006; NIH-HL-15469)

A quantitative description of hypoxia-induced periodic breathing is presented. On the basis of a series of experimental investigations of the empirical relationships between sleep-state, hypoxia, hypocapnic alakalosis hypoxia-induced ventilatory instability and periodic breathing. Six healthy male subjects were studied during sleep and wakefulness under conditions of both normoxia and hypobaric hypoxia in an altitude chamber. Measurements were made of arterial oxygen saturation, arterial pH, partial pressure of CO2, and ventilation (inductance plethysmography) in REM and non-REM stages of sleep. The results of the experiments are presented in the form of a generalized model of periodic breathing under hypoxic conditions. It is shown that the genesis of self-sustaining periodic breathing during non-REM sleep requires the combined influence of both hypoxia and hypocapnia. During wakefulness and REM sleep the state-dependent nonchemical influences on inspiratory activity contribute to the maintenance of respiratory cycle rhythm and may prevent periodic breathing and apneas by inhibiting the expression of a CO2-apnea threshold. The breath-to-breath pathogenic model is presented in the form of a schematic illustration. I.H.

A85-11012
MECHANISMS FOR RECURRENT APNEAS AT ALTITUDE
N. S. CHERNIACK, B. GOTHE, and K. P. STROHL (Case Western Reserve University, Cleveland, OH) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 129-140. refs

The results of a number of experiments investigating the physiological mechanisms for recurrent central obstructive breathing apneas at high altitude are reviewed. Attention is given to the role of hypoxia and hypocapnia in regulating apnea at altitude, as well as physical processes regulating the activity of the nasal, pharyngeal and laryngeal muscles in obstructive apneas. Instability in feedback control of respiratory function is also discussed as a possible cause of recurrent apnea, and the effect of high altitude hypoxia on the respiratory feedback control system is considered. I.H.

A85-11013
EFFECTS OF ACCLIMATIZATION ON SLEEP HYPOXEMIA AT ALTITUDE
J. R. SUTTON, G. W. GRAY, C. S. HOUSTON, and A. C. P. POWLES (McMaster University, Medical Centre, Hamilton, Ontario, Canada) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 141-146. refs

The results of a series of experimental investigations of the effects of acclimatization on sleep hypoxemia at altitude are reported. The studies were conducted on five normal male and

female subjects between the ages of 22-36 yrs, who had spent 3-5 days at a staging camp (3,290 m), and eight days at a high camp (5,360 m). It is found that all subjects experienced marked sleep hypoxemia during the night which is associated with periodic breathing or apnea. A statistical analysis of the mean oxygen saturation level showed that the true change in arterial oxygen saturation during sleep after acclimatization lies between -3.67 and 23.7 percent. I.H.

A85-11014
RESPIRATORY CONTROL IN ANDEAN AND HIMALAYAN HIGH-ALTITUDE NATIVES
S. LAHIRI (Pennsylvania, University, Philadelphia, PA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 147-162. refs
(Contract NIH-HL-26533)

The results of a number of experimental investigations of the ventilatory response characteristics of Himalayan Sherpas at an altitude of 5,400 m are reported. Several aspects of ventilatory control were examined, including variations in alveolar gas composition and CO2 partial pressure, the pH of arterial blood and cerebrospinal fluid, steady-state and non-steady-state ventilatory responses of work and at rest, and the hypoxic chemosensitivity of both Sherpas and a control group. A generalized theoretical model for ventilation response in high-altitude natives is proposed on the basis of the experimental data. I.H.

A85-11015
HIGH-ALTITUDE POLYCYTHEMIA
R. M. WINSLOW (U.S. Public Health Service, Center for Infectious Diseases, Atlanta, GA) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 163-172. refs
(Contract NSF INT-77-21795; NSF INT-80-07728)

The physiological mechanisms for erythropoeisis at high altitudes are briefly reviewed. Attention is given to the results of recent clinical studies of the physiological effects of polycythemia in natives to high altitude and lowlander visitors to high-altitudes. Some of the benefits and risks of phlebotomy and hemodilution treatments to reduce erythropoietic effects are considered. I.H.

A85-11016
VENTILATORY FUNCTION IN ADAPTATION TO HIGH ALTITUDE - STUDIES IN TIBET
S. Y. HUANG, X. H. NING, Z. N. ZHOU, Z. Z. GU, and S. T. HU (Chinese Academy of Sciences, Shanghai Institute of Physiology, Shanghai, People's Republic of China) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 173-177.

The ventilatory function of a group of Tibetan highlanders was compared to that of a group of lowlander visitors in order to test the hypothesis that Tibetans possess the highest degree of acclimatization to high-altitude conditions. Measurements were taken of minute ventilation, tidal volume, respiratory frequency, arterial O2 saturation, and for the partial pressure of CO2 in arterial blood. Arterial blood pH and diffusion capacity for CO were also measured. The results indicated that the patients with chronic mountain sickness had lower values for all but two of the ventilatory function indexes. Poorly acclimatized subjects who had polycythemia and required hospitalization for chronic mountain sickness had impaired ventilation and gas-exchange functions. It is concluded that polycythemia in Tibetans is less severe than in sojourners from lower altitudes, and that the acclimatized new arrivals to Tibet from lower altitudes and those who have remained for many months have the same ventilatory function as healthy Tibetans. I.H.

A85-11017
VENTILATION IN HUMAN POPULATIONS NATIVE TO HIGH ALTITUDE
P. H. HACKETT, J. T. REEVES, R. F. GROVER, and J. V. WEIL (Alaska, University, Anchorage, AK; Colorado, University, Denver, CO) IN: High altitude and man . Bethesda, MD, American Physiological Society, 1984, p. 179-191. refs

The combined results of a number of clinical investigations of the ventilation mechanisms of four different high altitude populations are compared, in order to develop a generalized theoretical model of ventilation in high-altitude natives. The studies were conducted on residents of Peru, Tibet, Nepal, and residents of Leadville, CO. A number of different aspets of ventilation function were examined, including: hypoxic ventilatory response (HVR), chronic mountain sickness, the changes in hemoglobin concentration with altitude, and the incidence of excessive polycythemia in high altitude natives. It is found that the relative importance of pulmonary ventilation in adaptation to altitude is also discussed. I.H.

A85-11734
MEDICAL SUPERVISION OF GLIDER PILOTS WORLDWIDE - THE RESULTS OF AN INTERNATIONAL SURVEY [LE CONTROLE MEDICAL DES PILOTES DE PLANEUR DANS LE MONDE RESULTATS D'UNE ENQUETE INTERNATIONALE]
P. KALT (Nancy I, Universite, Nancy, France), J.-P. CRANCE, and M. BOULANGE (Nancy I, Universite, Vandoeuvre-les-Nancy, Meurthe-et-Moselle, France) Medecine Aeronautique et Spatiale, vol. 23, 3rd Quarter, 1984, p. 218-223. In French. refs

A questionnaire was sent to various countries to ascertain the national medical standards for glider pilots. It is of concern that the physical health of glider pilots be sufficient to assure flight safety, while not necessarily requiring a fitness level needed by professional pilots. The advent of new, lightweight materials and improved aerodynamics is expanding the flight envelope of gliders. With 16 countries reporting, it was determined that not all countries require glider pilots to take medical examinations. Disparities also exist between internal requirements and ICAO standards for the minimum pilot age, the intervals between license renewals, and the kinds of tests for physical, visual, and hearing fitness. It is suggested that more stringent certification standards be established and agreed to on an international basis. M.S.K.

A85-11735
THOUGHTS ON THE PATHOGENESIS OF MOTION SICKNESS [REFLEXIONS SUR LA PATHOGENIE DES CINETOSES]
C. PERRIN (Centre Hospitalier Universitaire de Nancy-Brabois, Vondoeuvre-les-Nancy, Meurthe-et-Moselle, France) Medecine Aeronautique et Spatiale, vol. 23, 3rd Quarter, 1984, p. 227-230. In French. refs

Anxiety is the first symptom of motion sickness, and leads to increasingly more severe symptoms , e.g., sweating, vomiting, hypercardia, etc., which raise the level of anxiety and thus close the loop. About 15 percent of all pilots experience the condition, which may be critical for an astronaut. Air sickness, especially in weightlessness, arises from conflicting sensory data from vision, the muscle and tendons, and the labyrinthine canals. The latter are particularly sensitive to rotational and angular accelerations in response to quantifiable levels of excitation. The lack of stimulation from gravity also is an excitatory factor, as is the absence of normal cabin visual cues in helicopter night flights. The degree of susceptibility to motion sickness, however, varies from individual to individual. M.S.K.

A85-11736
A METHODOLOGY FOR STUDYING THE HEAD UP-HEAD DOWN TRANSITION [METHODOLOGIE D'ETUDE DE LA TRANSITION TETE HAUTE TETE BASSE]
J. P. MENU (Centre d'Enseignement et de Recherches de Medecine Aeronautique, Paris, France) and J. BRUN (Thomson - CSF, Paris, France) Medecine Aeronautique et Spatiale, vol. 23, 3rd Quarter, 1984, p. 230-233. In French. refs

Techniques devised to examine visual accommodation processes in pilots changing from head up views (HUV) to head down instrument reading (HDV) are described. The trials were run in terms of the Mirage 2000 aircraft, which requires a transition from a view at infinity to 60 cm distance. Subjects were exposed to simulated flight imagery and instrumental readings and required to attack or track an image and then to move to the HDV mode. Scores were recorded on the basis of task proficiency, response time and postural variation, and in terms of vocal or tactile response time. The presence of microfluctuations in vision during accommodation was confirmed, and oral responses were quicker than manual responses. Further tests are indicated on intermediate visual collimation. M.S.K.

A85-11737
THE COMPLETE RIGHT BUNDLE BRANCH BLOCK, ISOLATED AND NONSYMPTOMATIC, OF FLYING PERSONNEL [LE BLOC COMPLET DE BRANCHE DROITE DU FAISCEAU DE HIS, ISOLE ET NON SYMPTOMATIQUE, CHEZ LES MEMBRES DUE PERSONNEL NAVIGANT]
A. DIDIER, J. LAHAM, J. P. BURLATON, N. ALLEGRINI, and H. ILLE (Centre Principal d'Expertise Medicale du Personnel Navigant, Paris, France) Medecine Aeronautique et Spatiale, vol. 23, 3rd Quarter, 1984, p. 237-242. In French. refs

Complete right bundle branch blockage (RBBB) in pilots could be grounds for refusing to certify a pilot as fit to fly. However, an air medical examiner discovered 40 cases of RBBB over 8 yr of practice covering ECG tests of 11,600 pilots. Family and personal medical histories were developed of the RBBB pilots, echocardiograms were taken, and some underwent centrifuge tests, maximal effort tests, ventriculography and coronagraphy, and myocardial scintigraphy. The occurrence of RBBB was 3.45/1000 pilots of ages of 23-65 yr, the most frequency being over 50 yr of age. Onset began more than a third of the time between 30-40 yr. The ECG detected RBBB in terms of Wilson blocks. No confirmation was found of a congenital condition. In the absence of other symptoms, i.e., a diagnosis of isolated condition, even military flying is considered permissible. Further tests become necessary if other symptoms are noted. M.S.K.

A85-11738
CARDIO-VASCULAR EVALUATION OF THE PRIVATE PILOT [L'EXPERTISE CARDIO-VASCULAIRE DU PILOTE PRIVE]
F. G. MEIGNAN (Journee Regionale de Medecine Aeronautique Clinique, Marseille, France, Sept. 30, 1983) Medecine Aeronautique et Spatiale, vol. 23, 3rd Quarter, 1984, p. 243-246. In French.

The level of cardio-vascular health necessary for a pilot to be certified for flight fitness is discussed. ECGs and other tests are usually recommended only after the pilot reaches 40 yr of age. The tests seek evidence of dyspnea, syncope, mediothoracic anterior pain, palpitation and muscular cramps from exertion. High blood pressure can be tolerated only if the associated medication and the illness in no way degrade flight safety. Echocardiography is applied to discovering any cardiac obstruction should extra noises be heard during examinations. Each doubtful symptom leads to further tests. Weight losses may be recommended, as may changes of birth control methods. The important factor is to determine the source of any perceived irregularities and to assess their significance with respect to flight safety. M.S.K.

A85-11740
PROBLEMS LINKED TO CIRCADIAN RHYTHMS FOR FLYING PERSONNEL. II [LES PROBLEMES LIES AUX DECALAGES HORAIRES CHEZ LE PERSONNEL NAVIGANT. II]
M. S. MARTINOT and R. ANGIBOUST (Centre de Recherche de Medecine Aeronautique, Paris, France) Medecine Aeronautique et Spatiale, vol. 23, 3rd Quarter, 1984, p. 251-256. In French. refs

Pilots experience health and functional risks due to departure schedules which disrupt their circadian rhythms. The situation is most apparent with flights to the far east, where hotels and foods often have negative effects on rest and digestion. The disruptions are aggravated by flying in hostile weather, which increases the pilot workload. Night take-off or return flights further deprive the pilot of sleep and induce a state of stress. Using stimulants such as amphetamines to combat fatigue can lead to euphoria and threaten flight safety. Sleeping pills, available without prescription in many far east countries, provide similar hazards. Techniques which can ameliorate the difficulties include scheduling departures which coincide with circadian rhythms, or changing the rhythms to match flight schedules by shifting the awake-sleep cycle one hour per day, starting a sufficient time before a long distance flight. Other measures are assuring pilots of comfortable lodging and acceptable food, preselecting pilots who more easily accommodate circadian alterations, and maintaining close medical supervision of personnel who regularly fly long distance routes. M.S.K.

A85-11845
FLEXIBLE AND RIGID CONTRACTIONS IN THE REGULATION OF MOTOR ACTIVITY [GIBKIE I ZHESTKIE SVIAZI PRI REGULIATSII DVIGATEL'NOI DEIATEL'NOSTI]
N. V. ZIMKIN and A. M. ZIMKINA (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, July 1984, p. 1031-1037. In Russian. refs

Consideration is given to a description of the functions and interrelations between flexible and rigid connections during repeated stereotype activity. It is shown that flexible connections are necessary in the course of motor activity because of the constantly varying contractile capacity of muscles in response to changes in the internal environment (intramuscular temperature, oxygen saturation, and metabolite concentration). Flexibility is also related to the initial elongation of muscle fiber and a simultaneous contraction of muscles not directly related to test muscle activity. It is shown that different muscle loadings at different training levels can result in variations in the statistical relationship between rigid and flexible connections. I.H.

A85-12298
PREDICTING THE SUBJECTIVE RESPONSE TO NONSTEADY VIBRATION BASED ON THE SUMMATION OF SUBJECTIVE MAGNITUDE
K. HIRAMATSU (Kyoto University, Kyoto, Japan) and M. J. GRIFFIN (Southampton, University, Southampton, England) Acoustical Society of America, Journal (ISSN 0001-4966), vol. 76, Oct. 1984, p. 1080-1089. refs

The values of exponents of psychophysical functions for the discomfort produced by whole-body vertical vibration were determined, and the applicability of a method for predicting the average stimulus intensity of a stimulus whose intensity varies with time was investigated. The magnitude estimation method was used to experimentally study the effect of duration of vibration and of vibration acceleration magnitude on discomfort. The results show that the logarithm of the magnitude estimates is in linear proportion to both the logarithm of the acceleration and the logarithm of the duration. The point of subjective equality of each of 16 nonsteady vibrations was measured and compared with the stimulus intensity predicted by a proposed method. Good agreement is found, and it is shown that the proposed method can be applied to vibration as well as noise. C.D.

A85-12327
BREATHING AFFECTS VENOUS RETURN FROM LEGS IN HUMANS
R. WILLEPUT, C. RONDEUX, and A. DE TROYER (Erasme University Hospital; Brussels School of Medicine, Brussels, Belgium) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 971-976. refs

The effect of various breathing maneuvers on the blood flow in the femoral vein is investigated experimentally in three women and ten men in recumbent posture. The results are presented in tables and graphs and characterized. It is shown that quiet inspiration is accompanied by a fall in femoral venous flow (to 65 + or - 1 percent of the end-expiratory value) which is attributed to concomitant changes in abdominal pressure. Greater use of the diaphragm in breathing is found to produce greater decreases in venous return from the legs, while mainly rib-cage breathing leads to a slight increase in venous return. T.K.

A85-12328
PULMONARY FUNCTION CHANGES AFTER 1 H CONTINUOUS HEAVY EXERCISE IN 0.21 PPM OZONE
L. J. FOLINSBEE, J. F. BEDI, and S. M. HORVATH (California, University, Santa Barbara, CA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 984-988. Sponsorship: U.S. Environmental Protection Agency. refs
(Contract EPA-R-80790-02; NIH-HL-26034-2)

A85-12329
ENDURANCE TRAINING IN OLDER MEN AND WOMEN. I - CARDIOVASCULAR RESPONSES TO EXERCISE
D. R. SEALS, J. M. HAGBERG, B. F. HURLEY, A. A. EHSANI, and J. O. HOLLOSZY (Washington University, St. Louis, MO) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1024-1029. refs
(Contract NIH-AG-03038)

A85-12330
ENDURANCE TRAINING IN OLDER MEN AND WOMEN. II - BLOOD LACTATE RESPONSE TO SUBMAXIMAL EXERCISE
D. R. SEALS, B. F. HURLEY, J. SCHULTZ, and J. M. HAGBERG (Washington University, St. Louis, MO) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1030-1033. refs
(Contract NIH-AG-03038)

A85-12332
HEAT EXCHANGE DURING UPPER- AND LOWER-BODY EXERCISE
M. N. SAWKA, R. R. GONZALEZ, L. L. DROLET, and K. B. PANDOLF (John B. Pierce Foundation; Yale University, New Haven, CT; U.S. Army, Army Research Institute of Environmental Medicine, Natick, MA) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1050-1054. refs
(Contract NIH-OH-00836)

The roles of radiative-conductive (RC) and evaporative (E) heat loss during arm-crank or leg-crank ergometer exercise at O2 uptake 1.6 l/min are evaluated in four male subjects in environments with dew-point temperature 14 C and ambient temperature either 18 or 35 C. The parameters measured included torso RC (using a net radiometer), arm and thigh RC (using heat-flow disks), E (using ventilated dew-point sensors), and esophageal temperature; the results are presented in graphs and characterized. The only significant differences found to result from the different exercise types are greater torso RC, in either environment, during arm crank than during leg crank; greater leg RC during leg crank than during arm crank at 18 C; and greater leg E during leg crank than during arm crank at 35 C. A compensatory mechanism involving differential heat-transfer coefficients which affect tissue conductivity and mass transfer is considered. T.K.

A85-12333
PHYSIOLOGICAL RESPONSES TO EXERCISE AT 47 AND 66 ATA
J. V. SALZANO, E. M. CAMPORESI, B. W. STOLP, and R. E. MOON (Duke University, Durham, NC) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1055-1068. Research supported by the Shell Oil International, Oceaneering International, and U.S. Navy. refs
(Contract NIH-HL-07896)

The work tolerance and physiological responses to different atmospheres (air; O2/N2; He/O2; and He/O2/N2 with inspiratory partial O2 pressure 0.5 and N2 2.34, 4.67, or 6.56) at pressures 47 and 66 ATA are determined experimentally in three simulated dives involving five male subjects. The results are presented in detailed tables and graphs and characterized. A predominantly inspirational dyspnea is observed in all subjects but does not prevent performance of work requiring O2 uptake excess of 2 l/min, although this performance is accompanied by alveolar hypoventilation, arterial hypercapnia, increased dead space, higher arterial lactate concentration, and simultaneous respiratory and metabolic acidosis (without the increased ventilation observed at 1 ATA). The acidosis is more severe than at 1 ATA, but does not vary significantly between 47 and 66 ATA or as the N2 partial pressure in the He/O2/N2 mixture is increased from zero to 6.56 (corresponding to an inspired mixture density range 7.9-17.1 g/l). T.K.

A85-12334
EFFECTS OF SLEEP STATE ON VENTILATORY ACCLIMATIZATION TO HYPOXIA IN HUMANS
A. D. BERSSENBRUGGE, J. A. DEMPSEY, and J. B. SKATRUD (Wisconsin, University; William S. Middleton Memorial Veterans Hospital, Madison, WI) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1089-1096. Research supported by the U.S. Veterans Administration. refs
(Contract DAMD17-77-C-7006; NIH-HL-15469)

Ventilatory acclimatization to hypobaric hypoxia (455 torr) over a 4-day period is monitored in seven male subjects during wakefulness (W), non-REM (NREM) sleep, and REM sleep. Parameters measured include material partial CO2 pressure, pH, and O2 saturation; minute ventilation; tidal volume; and breathing rate. The results are presented in tables and graphs and discussed. Relative hypoventilation during sleep is observed in normoxia and hypoxia, while the time-dependent response to hypoxia is found to be the same in W, REM, and NREM. It is inferred that ventilatory acclimatization does not require suprapontine control of ventilatory processes. T.K.

A85-12335
INSPIRATORY FLOW PATTERN IN HUMANS
C. L. LAFORTUNA, A. E. MINETTI, and P. MOGNONI (CNR, Centro Studi di Fisiologia del Lavoro Muscolare, Milan, Italy) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1111-1119. refs

Inspiratory flow curves recorded during rest, exercise hyperventilation (EH), and maximum voluntary ventilation (MVV) in six male subjects are subjected to Fourier analysis of their harmonic content, and the results are compared with those of model computations assuming sinusoidal or rectangular waves in terms of the dynamic work of breathing (DWB). The data and results are presented in graphs and tables and discussed. It is found that the experimental and sinusoidal-model DWB levels are approximately equal in the resting state, but that the experimental wave during EH or MVV is 16-20 percent more efficient than the sinusoidal wave. T.K.

A85-12336
INFLUENCE OF BLOOD FLOW ON CUTANEOUS PERMEABILITY TO INERT GAS
Y. C. LIN, N. KAKITSUBA, D. K. WATANABE, and G. W. MACK (Hawaii, University, Honolulu, HI) Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology (ISSN 0161-7567), vol. 57, Oct. 1984, p. 1167-1172. Research supported by the University of Hawaii and Hawaii Heart Association. refs (Contract NOAA-NA-81AAD00070)

The relationship between cutaneous blood flow and outward transcutaneous diffusion of He or N2 is investigated experimentally in the hands of three healthy male subjects. Blood flow is changed by varying the temperature in the measurement chamber between 20 and 40 C, and the results of conductance, permeability, and body-store replacement-time computations are presented in tables and graphs. It is found that He and N2 conductance and permeability both increase exponentially as a function of temperature and hence of blood flow, with He permeability slightly higher than N2 permeability and with a corresponding reduction in the N2 replacement time (by transcutaneous diffusion alone) from 26.8 h at 31 C to 15.1 h at 37 C. It is suggested that the efficiency of decompression procedures can be increased by adjusting the inert-gas transcutaneous pressure gradient and increasing the ambient temperature. T.K.

A85-12425
AVIATION MEDICINE
R. M. HARDING and F. J. MILLS (RAF, Institute of Aviation Medicine, Farnborough, Hants., England) London, British Medical Association, 1983, 148 p. refs

After discussing the range of medical emergencies for which commercial airline operators must be prepared, and the various factors affecting the fitness of passengers for air travel, attention is given to such fundamental problems of flight at high altitudes as pressure and temperature drops with increasing altitude, the required pressurization of cabins, and the emergency measures called for by safe depressurization. The physiological factors responsible for hypoxia, hyperventilation, and decompression thickness are then treated, as well as the response of passengers to various forces of acceleration. The ways in which the visual, vestibular and auditory senses respond to abnormal flight environments are discussed, together with the perceptual and workload limitations affecting 'aviation psychology'. Attention is given to the fitness of crew members for airline operations. O.C.

N85-10052*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF FOVEAL INFORMATION PROCESSING
R. L. HARRIS, SR. *In* NASA. Dryden Flight Research Center Peripheral Vision Horizon Display (PVHD) p 81-88 Apr. 1984 refs
Avail: NTIS HC A07/MF A01 CSCL 06P

The scanning behavior of pilots must be understood so that cockpit displays can be assembled which will provide the most information accurately and quickly to the pilot. The results of seven years of collecting and analyzing pilot scanning data are summarized. The data indicate that pilot scanning behavior is: (1) subsconscious; (2) situation dependent; and (3) can be disrupted if pilots are forced to make conscious decisions. Testing techniques and scanning analysis techniques have been developed that are sensitive to pilot workload. B.W.

N85-10607# Japanese Air Self-Defense Force, Tokyo. Aeromedical Lab.
THE EFFECTS OF ISOTONIC TRAINING ON +GZ TOLERANCE
C. MIZUMOTO and M. IWANE *In its* The Repts. of Aeromedical Lab., Vol. 25, No. 1/2 p 15-30 Jun. 1984 refs In JAPANESE; ENGLISH summary
Avail: NTIS HC A05/MF A01

The effects of isotonic training on the tolerance to + Gz were evaluated. Five healthy, sedentary men aged from 20 to 31 performed the weight training program consisting of nine exercises: leg press, bench press, back extension, chin up, leg curl, straight arm pulldown, shoulder shrug, sit up, and arm curl. The main results obtained include: (1) muscle strength including back strength, grip strength, and leg strength increased significantly with the training; (2) the tolerance to gradual onset run exposure increased by 0.4 to 0.9G in four subjects and did not change in one; (3) the tolerance to rapid onset run (ROR) exposure increased by 1.0 to 1.5G in two subjects, did not change in two, and decreased in one by 0.5G; and (4) the correlation between the tolerance to ROR exposure and the weight of one maximum repetition of leg press was statistically significant. It is concluded that the weight training, especially the leg press, was effective in improving the G tolerance. R.S.F.

N85-10610# Japanese Air Self-Defense Force, Tokyo. Aeromedical Lab.
A STUDY OF FATIGUE OF SHIFTWORKERS IN AIR TRAFFIC CONTROL AND WEATHER SERVICE GROUPS IN JASDF
O. FUJIWARA, Y. KAKIMOTO, M. OKAUE, A. NAKAMURA, H. ARUGA, Y. TAKEUCHI, F. TAJIMA, I. SAKURAI, and S. SHIMIZU *In its* The Repts. of Aeromedical Lab., Vol. 25, No. 1/2 p 65-85 Jun. 1984 refs In JAPANESE; ENGLISH summary
Avail: NTIS HC A05/MF A01

The fatigue of air traffic controllers and weather service persons working shiftwork was investigated. Subjective fatigue, flicker value, urinary excretion of 17-OHCS, heart rate, and sleep surveys were used for a fatigue assessment scale. Cornnel Medica Index (CMI) and fatigue feeling surveys were also carried out. Results suggest that: (1) fatigue resulting from one cycle of shiftwork was largely offset by off duty rest; (2) normal circadian rhythms were frequently disturbed in weather observers and teletype operators who had to k through midnight without a sleep; (3) there was no difference in average sleeping time between daytime workers and shiftworkers; (4) fatigue complaints among shiftworkers tended to increase in over forty-one years old; and (5) 3.6% of air traffic controllers and weather service persons diagnosed to be neurotic by the CMI tended to have stronger fatigue feeling and sleep-related dissatisfaction. R.S.F.

N85-10615# Joint Publications Research Service, Arlington, Va.
VITAMIN METABOLISM IN COSMONAUTS FOLLOWING SHORT-TERM FLIGHTS
M. S. BELAKOVSKIY, N. D. RADCHENKO, and N. G. BOGDANOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 23-27 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 19-22
Avail: NTIS HC A07

The vitamin status of the cosmonauts after short term (4 to 13 days) flights showed different variations. Vitamin consumption was basically adequate to the requirements in space flights. Some vitamins were occassionally in deficiency, thus indicating their enhanced metabolization. Author

N85-10616# Joint Publications Research Service, Arlington, Va.
COMPENSATORY AND ADAPTIVE REGIONAL HEMODYNAMIC REACTIONS TO WEIGHTLESSNESS DURING LONG-TERM SPACEFLIGHTS
K. K. YARULLIN, T. D. VASILYEVA, V. F. TURCHANINOVA, I. V. SOKOLOVA, and N. D. VIKHAREV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 28-36 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 22-28
Avail: NTIS HC A07

Regional hemodynamics and vascular regulation during and after spaceflights of over 3 months in duration are discussed. Mechanisms of cardiovascular adaptation to weightlessness are described. The postflight differences in the recovery of regional hemodynamics seem to depend on the individual characteristics, age related changes of the cardiovascular system, as well as the

countermeasures and rehabilitation measures performed during and after flight. Author

N85-10617# Joint Publications Research Service, Arlington, Va.
FUNCTIONAL CAPACITIES OF ELDERLY SUBJECTS EXPOSED TO SIMULATED SPACEFLIGHT FACTORS
T. N. KRUPINA, K. K. YARULLIN, N. P. ARTAMONOVA, V. A. GORNAGO, D. A. ALEKSEYEV, N. I. TSYGANOVA, M. P. KUZMIN, L. M. FILATOVA, L. A. FOTINA, and O. A. SMIRNOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 37-42 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 29-32
Avail: NTIS HC A07

In response to stimulated space flights cardiovascular and metabolic changes of 86 volunteers, aged 40 to 49 and 50 to 56, were similar to those of young people (25 to 39 years old). In most aged test subjects, the changes produced by 8 day head down tilt (-8 deg) and 7 day water immersion were moderate and reversible. This type of variation of the adaptive compensatory reactions give evidence that aged people have sufficiently high functional capabilities. Nevertheless, 36% test subjects, aged 40 to 49, and 50% test subjects, aged 50 to 56, displayed certain features suggesting a reduction of the adaptive compensatory capabilities (functional reserves) as a result of age related and atherosclerotic changes of the cardiovascular system. Author

N85-10618# Joint Publications Research Service, Arlington, Va.
EFFECT OF FLUID AND SALT SUPPLEMENTS TO FOOD ALLOWANCE ON ENDURANCE OF HEAD-TO-PELVIS ACCELERATIONS FOLLOWING 7-DAY DRY IMMERSION AND UNDER ORDINARY MOTOR ACTIVITY CONDITIONS
N. I. KOKOVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 43-49 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 33-37
Avail: NTIS HC A07

The effect of water salt supplements as an agent increasing human tolerance to head to feet acceleration with a slow onset was examined. The test subjects were rotated in a 7.25 m arm centrifuge after 7 day dry immersion or normal motor activity. The water salt supplements were given at a dose of 0.15 g NaCl and 18 ml water per kg body weight (with the total daily dose consumed in four fractions). During immersion fluid retention was significantly higher than during normal activity (818 + or - 139.7 ml versus 478 + or - 69 ml). Water salt supplements consumed produced a positive effect on tolerance to head to feet acceleration. During centrifugation after water salt supplementation the physiological responses were less strained. Water salt supplements taken on the last immersion day increased the tolerance level as compared to the control. The amount of the fluid retained in the body was found to be inversely proportional to the tolerance level. It is concluded that water salt supplements may be recommended to increase tolerance to head to feet acceleration in aerospace medicine. Author

N85-10626# Joint Publications Research Service, Arlington, Va.
REACTION OF CEREBRAL VENTRICLES TO ANTIORTHOSTATIC POSITION AND OCCLUSION OF JUGULAR VEINS
V. I. SOKOLOV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 94-98 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 66-69
Avail: NTIS HC A07

Twenty male test subjects were subdivided into two groups with respect to the reactions of their brain ventricles to a preliminary head-down test (-30 deg). Group 1 consisted of subjects who showed ventricular enlargement, headache, and nausea; group 2 included subjects without these reactions. The subjects were also exposed to tests with neck vein occlusion. The first (continuous) test was performed at +40 mm Hg for 5 min; the second (step) test was carried out from +10 to +50 mm Hg for 2 min at each step. The results obtained demonstrate that an adequate venous outflow from the cranial cavity influences brain ventricles; the data also provide evidence that changes in compensatory mechanisms are detectable using occlusion tests. Author

N85-10627# Joint Publications Research Service, Arlington, Va.
EFFECT OF MAXIMUM PHYSICAL LOAD ON OXYGEN-TRANSPORT PROPERTIES OF BLOOD
L. A. IVANOV and N. D. CHEBOTAREV *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 99-104 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 69-72
Avail: NTIS HC A07

Ventilation, gas exchange, gas composition, and pH of venous blood, as well as oxyhemoglobin dissociation curves, were investigated during exercise tests of nine healthy male volunteers aged 19 to 31. During maximal exercises, the dissociation curve shifted to the right. The shift was associated with the extra erythrocyte factor, i.e., the Bohr effect, due to metabolic acidosis in muscles. The shift which indicates a lower hemoglobin affinity for oxygen and a higher oxygen release by the blood is of adaptive importance: during exercises oxygen supply to tissues increases. This shift is also suggested by an increase of venous pO2 during muscle work. Author

N85-10628# Joint Publications Research Service, Arlington, Va.
EFFECT OF HYPEROXIA AND INCREASED GAS ATMOSPHERE DENSITY ON CONTRACTILE FUNCTION OF THE RIGHT VENTRICLE
V. I. KULESHOV and Y. V. NAMLINSKIY *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 105-110 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 73-76
Avail: NTIS HC A07

Rheocardiography, phonocardiography, and electrocardiography were used to investigate the right ventricle function of 16 male test subjects exposed to various gas atmospheres under increased pressure. During short-term exposures, the adverse effect of an increased pressure on the contractile function of the right ventricle grew in the following order: hyperoxia-normoxic nitrogen-oxygen atmosphere--compressed air. Author

N85-10629# Joint Publications Research Service, Arlington, Va.
CHANGE IN ENERGETICS OF MUSCULAR CONTRACTION AS A RESULT OF HYPEROXIA
L. D. PCHELENKO and N. A. BEBYAKOVA *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 111-117 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 77-81
Avail: NTIS HC A07

Using a highly sensitive thermometric method, it was found that the heat production of a single isometric contraction of an isolated diaphragm of the rats exposed to 99% O2 at normal pressure for 3 and 6 hours significantly differed from the norm. After 3 hr hyperoxygenation muscle heat production increased almost three-fold, and after 6 hr of hyperoxygenation it decreased almost two-fold. The increase is regarded as a result of an oxygen-potentiated increase of energy expenditures involved in a contraction and of a decrease of the performance of muscle contraction. The decrease is considered to be a consequence of the primary uneconomical energy expenditures by an intensively working muscle (represented by the diaphragm) and of a reduced viability of the muscle preparation incubated in vitro. Author

N85-10630# Joint Publications Research Service, Arlington, Va.
HEMODYNAMICS AND NEURODYNAMICS OF THE HUMAN BRAIN DURING EXPOSURE TO MODERATE HYPOXIC HYPOXIA
D. A. ALEKSEYEV, A. F. ZUBAREV, T. N. KRUPINA, K. K. YARULLIN, Y. I. KUZNETS, and M. P. KUZMIN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 118-125 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 81-86
Avail: NTIS HC A07

Synchronous electro- and rheoencephalography were used to study tolerance to moderate hypoxic hypoxia for 30 min at an altitude of 5000 m without additional oxygen supply. Test subjects were men with autonomic-vascular dystonia (29 to 39 years old), 15 men over 40 (41 to 56 years old), and 16 essentially healthy controls (23 to 36). The aged volunteers (41 to 56 years old) did not differ from the controls with respect to their tolerance to hypoxic hypoxia. The men with early symptoms of hypertonic-type dystonia also showed high tolerance to hypoxic hypoxia. The subjects with hypotonic-type dystonia displayed lower tolerance. Author

N85-10636* National Aeronautics and Space Administration, Washington, D. C.
SPACE MEDICINE AND BIOLOGY, CONTINUING BIBLIOGRAPHY (SUPPLEMENT 263)
Oct. 1984 114 p
(NASA-SP-7011(263); NAS 1.21:7011(263)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 403 reports, articles and other documents introduced into the NASA scientific and technical information system in September 1984. E.R.

N85-10637# Letterman Army Inst. of Research, San Francisco, Calif.
EFFECTS OF REPETITIVE, SMALL-SPOT, INCOHERENT LIGHT FLASHES ON PURSUIT TRACKING PERFORMANCE Final Report, Jul. - Oct. 1981
R. R. LEVINE, P. A. OMARA, D. A. STAMPER, J. W. MOLCHANY, and D. J. LUND Jun. 1984 41 p
(Contract DA PROJ. 3E1-62777-A-878)
(AD-A144848; AD-E751084; LAIR-176) Avail: NTIS HC A03/MF A01 CSCL 06P

The effects of repetitive, small-spot incoherent light flashes on pursuit tracking was studied in the BLASER tracking simulator under bright and dim ambient light conditions. Ten experimentally naive men served as volunteers. The target was a scale-model tank moving at a constant angular velocity of 5 mrad/sec at a simulated distance of 1 km. A series of 5 flashes, presented at a rate of 20 Hz, were presented during randomly selected tracking trials. Flashes were produced with a miniature xenon flash lamp housed within the tracking device and spatially filtered to produce a 100 micro retinal diameter spot at approximately 50% of the maximum permissible exposure level. Colored filters in front of the lamp were used to produce flashes in the red and green portions of the spectrum. Unfiltered light from the lamp produced white-light flashes. The flashes produced statistically significant increases in the horizontal standard deviation error scores. These were manifested mainly by lead or lag errors (crosshairs ahead or behind the target) in response to the flash, followed by a return to baseline error levels. The magnitude of this effect was greater in the dim viewing condition than in the bright, as measured by maximum aiming error and the temporal course of recovery. No significant effect was observed for flash color. GRA

N85-10638# Army Research Inst. of Environmental Medicine, Natick, Mass.
THE EFFECT OF NAPROXEN ON ACUTE MOUNTAIN SICKNESS AND VASCULAR RESPONSES TO HYPOXIA
R. T. MEEHAN, A. CYMERMAN, P. ROCK, C. S. FULCO, and J. HOFFMAN 15 Aug. 1984 21 p
(AD-A145144) Avail: NTIS HC A02/MF A01 CSCL 06O

The role of prostaglandins in the pathogenesis of acute mountain sickness and two hypoxia-induced vascular responses was evaluated using the cyclooxygenase inhibitor naproxen. Eleven males spent 24h at sea level, followed by 34h of decompression to 428 torr while receiving naproxen (N), 250 mg twice daily or placebo (P) in a double-blind crossover trial. Serum naproxen levels by high pressure liquid chromatography were not changed by hypoxia. Retinal artery diameter measured from projected fundus photographs was increased after 27h at altitude (11.4 + or - .5mm) vs sea level (9.4 + or = .5mm, $p < .05$) during both trials. Upright mean arterial pressure fell after 6h at altitude (79 + or - 3 mmHg during N and P vs. 92 + or - 3 at S.L., $p < .01$). The severity of acute mountain sickness (AMS) by the Environmental Symptoms Questionnaire scores and observer assessment were unaffected by drug treatment. Minute ventilation, and expiratory alveolar P02 and PC02 did not differ between drug trials. This study suggests vasodilating prostaglandins do not have a major role in the genesis of AMS, hypoxia-induced retinal vasodilatation, or postural blood pressure responses in man. GRA

N85-10639# Army Research Inst. of Environmental Medicine, Natick, Mass.
VOLUNTARY DEHYDRATION AND ELECTROLYTE LOSSES DURING PROLONGED EXERCISE IN THE HEAT
L. E. ARMSTRONG, R. W. HUBBARD, P. C. SZLYK, W. T. MATTHEW, and I. V. SILS 1984 26 p
(Contract DA PROJ. 3E1-62777-A-879)
(AD-A145157; AD-E450013) Avail: NTIS HC A03/MF A01 CSCL 06S

The effects of water temperature and flavoring on voluntary dehydration (D), sweat electrolyte losses (SEL) and total body electrolyte losses (TBE) were studied in 12 healthy males during six hours of intermittent exercise at 40.6 C DB, 25.5 C WB. Trials involved three water temperatures (6, 22, 46 C) and two flavorings (Chlorinated and plain). Subjects (Ss) who were presented with 46 C water consumed less ($p < 0.0001$), had a larger % body weight loss ($p < 0.0001$), and a D which was 1050 g larger ($p < 000.1$) than subjects who consumed 6 C. Most of the Na+ was secreted in sweat, while K+ losses primarily originated in urine. Based on 24 hour projections of total body electrolyte balance, K+ depletion was considered to be more likely than Na+ depletion because food can be easily supplemented with sodium chloride. GRA

N85-10640# Fondazione Ugo Bordoni, Rome (Italy).
A HUMAN VISUAL SYSTEM INVESTIGATION APPLICABLE TO IMAGE CONTOUR CODING [INDAGINE SUL COMPORTAMENTO DEL SISTEMA VISIVO UMANO AI FINI DELLA CODIFICAZIONE DEI CONTORNI DI FIGURE]
R. CUSANI, G. DIBLASIO (Rome Univ.), A. ORLANDO, and F. PAPA Dec. 1983 50 p refs In ITALIAN
(FUB-36-1983) Avail: NTIS HC A03/MF A01

A model of the human visual system, limited to the first stages of data processing is presented. The model is based on experiments using monkeys. The goal is to provide ways of reducing redundancy in image processing. Processing structures for the perception of contour linear elements are described. It is shown that image contour coding may be limited to the parameters of the acquirable elementary stimulus with non-zero output.
Author (ESA)

N85-10641# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Vision Group.
THE PERCEPTUAL QUALITY OF SMOKE SCREENS: AN ANALYSIS OF THE OLDEBROEK 2 TRIALS, MAY 1981
J. M. VALETON Jul. 1984 56 p refs
(Contract A79/KL/151)
(IZF-1984-20; TDCK-79369) Avail: NTIS HC A04/MF A01

Target detection by human observers with unaided vision was recorded during field trials, using hexachloroethane and white phosphorus smoke, to obtain a perceptual quality measure for a smoke screen, as a single-parameter index. Smoke was laid midway between observers and targets. Target visibility was continuously recorded. Cumulative distributions of recorded holes and obscurations were determined over 7 duration classes from 2 to 40 sec. A see-through probability for each smoke screen was obtained, and is proposed as a single-parameter quality index Q, expressed in percent: 100% is a perfect smoke screen, Q = 80% means that there is an effective see-through probability of 20% and Q = 0% is no smoke. Author (ESA)

N85-10642# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Vision Group.
THE PREDICTION OF OBSERVER RESPONSES FROM PHOTOMETRIC DATA ON SMOKE SCREENS; AN ANALYSIS OF THE OLDEBROEK 2 TRIALS, MAY 1981
J. M. VALETON Jul. 1984 19 p refs
(Contract A79/KL/151)
(IZF-1984-21; TDCK-79370) Avail: NTIS HC A02/MF A01

Photometric measurements were made on smoke screens and the visual obscuration was evaluated. The relation between photometric and observer response data was analyzed. The correlation coefficients are in the range 0.50 to 0.98. The lower values occur in events with many holes and are attributed to technical limitations in the measurement and analysis methods. It is concluded that observer scores can be predicted from photometric data. Author (ESA)

N85-10643# Southwest Research Inst., San Antonio, Tex.
MOBILE SOURCE EXPOSURE ESTIMATION Final Report, Jun. 1982 - May 1983
M. N. INGALLS Mar. 1984 136 p refs
(Contract EPA-68-03-3073)
(PB84-224518; EPA-460/3-84-004) Avail: NTIS HC A07/MF A01 CSCL 06E

A national exposure, in person hours, to nonreactive mobile source pollutants was analyzed. The basis for the estimate was the EPA NAAOS Exposure Model (NEM) as applied to carbon monoxide, supplemented by four mobile source microenvironments: parking garages, street canyons, on expressways, and roadway tunnels. The CO concentration distributions and national population estimates, by hour of the day, for each of these mobile source microenvironments were developed. The information was combined to determine national exposure in the microenvironments. By using the mobile source CO emission factor, exposure to mobile source pollutants based on a pollutant emission rate of one gram per minute was determined for each of the microenvironments and the environments covered by the NEM. The methodology for using this information to determine exposure to any mobile source pollutant, regulated or unregulated is explained. GRA

N85-11071# Joint Publications Research Service, Arlington, Va.
TASS REPORTS MEDICAL, MATERIALS STUDIES ABOARD SALYUT-7 Abstract Only
In its USSR Rept.: Space (JPRS-USP-84-005) p 24 26 Oct. 1984 Transl. into ENGLISH from Pravda (Moscow), 21 Jul. 1984 p 1
Avail: NTIS HC A07

The spaceship 'Soyuz T-12' docked with the orbiting complex 'Salyut-7'--'Soyuz T-11', which is piloted by a crew of three cosmonauts. After checking the seal of the docking mechanism, three cosmonauts, went inside the 'Salyut-7' station. Six Soviet cosmonauts, including a woman, are working in near Earth space on board the scientific resarch complex 'Salyut-7'--'Soyuz T-11'--'Soyuz T-12'. The program of the joint mission calls for technical and technological experiments, observations of photography of the Earth's surface, and medical-biological, astrophysical and other studies. According to telemetry data, the onboard systems of the scientific research complex 'Salyut-7'--:Soyuz T-11'--'Soyuz T-12 are functioning normally. Author

N85-11525* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY, A CONTINUING BIBLIOGRAPHY WITH INDEXES
Nov. 1984 103 p
(NASA-SP-7011(264); NAS 1.21:7011(264)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 365 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1984. E.A.K.

N85-11526# Canadian Centre for Occupational Health and Safety, Hamilton (Ontario).
THE CASE FOR CONCERN ABOUT VERY LOW FREQUENCY FIELDS FROM VISUAL DISPLAY TERMINALS: THE NEED FOR FURTHER RESEARCH AND SHIELDING OF VDTS
K. MARHA, B. SPINNER, and J. PURDHAM 22 Apr. 1983 25 p refs
(CCOHS-P83-2E; ISBN-0-660-11440-2) Avail: NTIS HC A02/MF A01

Very low frequency (VLF) electromagnetic fields emitted from visual display terminals (VDT) are considered. Evidence of pulsed VLF electromagnetic fields from VDTs is presented along with evidence of biological and detrimental effects of pulsed electromagnetic radiation. The effectiveness of radiation shielding is also addressed. Existing radiation standards and exposure limit values are given. R.S.F.

N85-11527# Canadian Centre for Occupational Health and Safety, Hamilton (Ontario).
PHOTOCOPIERS: DO THEY POSE A HEALTH HAZARD?
D. M. HALTON Apr. 1983 28 p refs
(P83-1E; ISBN-0-660-11439-9) Avail: NTIS HC A03/MF A01

The current technologies used in photocopying machines are briefly described. Concerns that were raised about health and safety at each step of the copying process are discussed. Particular emphasis was placed on the chemical components of the copying technologies. Where appropriate, exposure controls are suggested. Recommendations are made with regard to the safety features of machines and the need to enhance the free flow of information from the manufacturers to the public. Author

N85-11528# Naval Health Research Center, San Diego, Calif.
THE EFFECT OF SLEEP LOSS ON THE HUMAN VISUAL EVENT-RELATED POTENTIAL Interim Report
D. J. HORD and M. TRACY 1984 13 p
(Contract DARPA ORDER 1596; F63528)
(AD-A145364; NAVHLTHRSCHC-84-24) Avail: NTIS HC A02/MF A01 CSCL 06P

In eight volunteer subjects, the latency of both crest and trough components of visual sensory Event-Related Potentials (ERPs) was found to be increased following 48 hours of total sleep deprivation, relative to baseline levels. The amplitude of the component was not affected, nor was the recovery cycle. These results, together with previously reported data from other studies, led to the hypothesis that the ERP may be a measure of brain function that differentiates fatigue and drowsiness. Whereas drowsiness is accompanied by changes in amplitude but not latency of the ERP, after sleep deprivation the opposite effect is seen; the latency of visual ERPs increases but amplitude is not affected. The ERP may prove to be a rapidly obtained, objective measure of fatigue that does not depend on subjective responses or on complex behavioral tests. Author (GRA)

N85-11529# Harvard Medical School, Boston, Mass. Dept. of Physiology and Biophysics.
JET LAG PREVENTION: PHYSIOLOGICAL MECHANISMS AND PHARMACOLOGICAL THERAPY Final Scientific Report, 1 Apr. 1978 - 31 Mar. 1983
M. C. MOORE-EDE 31 Mar. 1984 17 p
(Contract AF-AFOSR-3560-78)
(AD-A145444; AFOSR-84-0752TR) Avail: NTIS HC A02/MF A01 CSCL 06P

This research program was concerned with the physiological mechanisms that underlie the phenomenon of jet-lag and was aimed at developing therapeutic techniques to minimize the performance and physiological deficits that occur in rapid transmeridian air travel. During the course of this project, the circadian pacemaker responsible for the timing of the daily rest-activity was identified in the brain of the diurnal primate, the squirrel monkey (Saimiri sciureus). The suprachiasmatic nuclei were also identified in the human brain. A number of other significant advances included: developing a model of the circadian sleep-wake cycle, characterizing how phase shifts of the light-dark cycle reset the timing of the sleep-wake cycle, and identifying pharmacological agents which can phase-reset the circadian system. GRA

N85-11530# Naval Aerospace Medical Research Lab., Pensacola, Fla.
DARK FOCUS: INTERSUBJECT VARIATION, INTRASUBJECT STABILITY, AND RELATIONSHIP TO NEAR RETINOSCOPY Interim Report
W. A. MONACO and C. G. KNOWLTON Apr. 1984 18 p
(AD-A145489; AD-E000594; NAMRL-1307) Avail: NTIS HC A02/MF A01 CSCL 06P

Previous studies have shown that dark focus varies between individuals while remaining relatively fixed over time. These relationships were quantified in a population of future naval aircrewmen to determine whether or not individual variability exists in a group who have met stringent visual screening requirements. In addition, it has been reported that near retinoscopy, a clinical measure, is a means to determine dark focus that may be used by clinicians. The relationship between near retinoscopic values and dark focus measures needed further study. This study found that dark focus exhibited intersubject variation and intra-subject stability in a population of future naval aircrewmen. Because dark focus is correlated with empty field myopia, it could have potential in screening aviators for susceptibility to empty field myopia and their ability to detect air-to-air targets. Near retinoscopy was found to be correlated with dark focus, but further study is needed to define the relationship. GRA

N85-11531# Texas Univ., Arlington. Arlington.
EYELID MOTION SEQUENCES PREDICTIVE OF DECISION ERRORS Final Report, Apr. 1983 - Aug. 1984
M. L. LOBB 30 Aug. 1984 13 p
(Contract AF-AFOSR-0129-83)
(AD-A145702; AFOSR-84-0773TR) Avail: NTIS HC A02/MF A01 CSCL 06P

Nine normal human subjects were measured by electrooculographic and video tape of the eyes during performance on a human/animal analog of the serial probe recognition task. The task was modified to distinguish attention (the missed signal) errors from decision (failure to make same versus different discrimination) errors. Two types of eyelid closing and reopening sequences were observed to be progressive with time-on-task, with the earlier, Type 1 sequence being indicative of correct responses. The velocity of the eyelid in motion over the pupil also significantly discriminated decision correct from decision error trials. The results were interpreted to support the hypothesis that information processing function progressively deteriorates over time-on-task and is indicated by variations in oculomotor patterns. GRA

N85-11532# Harvard Medical School, Boston, Mass. Dept. of Physiology and Biophysics.
MATHEMATICAL MODELS OF THE CIRCADIAN SLEEP-WAKE CYCLE Final Scientific Report, 1 May 1981 - 30 Nov. 1982
M. C. MOORE-EDE, ed. and C. A. CZEISLER, ed. New York, New York Raven Press 1 May 1984 226 p Proceedings of the Satellite Symp. on the Math. Modeling of Circadian Systems, Cape Cod, Mass., 21 Jun. 1981
(Contract AF-AFOSR-0133-81)
(AD-A145712; AFOSR-84-0781TR) Avail: NTIS HC A11/MF A01 CSCL 06P

This contract funded a Satellite Symposium on the Mathematical Modeling of Circadian Systems which was held on June 21, 1981 in conjunction with the Annual Meeting of the Association for the Psychophysiological Study of Sleep (APSS) from June 17-21, 1981, at Dunfey's Hyannis Hotel on Cape Cod, Massachusetts. The Satellite Symposium brought together the leading investigators concerned with modeling the circadian system to ensure that the various proposed models were critically reviewed and their strengths and weaknesses in predicting periodic biological phenomena were fully understood. The papers of each participant and an edited transcription of the discussion were published as a book entitled 'Mathematical Models of the Circadian Sleep-Wake Cycle' by Raven Press in 1984. The published volume serves as an important source of all those who are concerned about the temporal organization of human and animal behavior and physiology. Author (GRA)

N85-11533# Research Inst. of National Defence, Stockholm (Sweden).
MAN'S PHYSICAL TOLERANCE TO HEAT. HEAT STORAGE, BURN INJURY
U. DANIELSSON May 1984 54 p refs In SWEDISH; ENGLISH summary
(FOA-C-54055-H1; ISSN-0347-7665) Avail: NTIS HC A04/MF A01

Heat exposure time which results in 50% risk of heat exhaustion was calculated for metabolic heat production = 150 W/sq m and 300 W/sq m, and air temperature and heat radiation between 60 C, 1200 W/sq m and 300 C, 7300 W/sq m. These parameters correspond to moderate and heavy physical workloads in an ordinary indoor fire. The effects of time to heat exhaustion were calculated for clothes with various insulations for air temperature = 140 C. The shortest time to heat exhaustion, not resulting in heat injury, is 5 min if the body is uniformly exposed. The capacity of protective clothing to reduce heat load depends on the thickness of the material. Author (ESA)

N85-11534# Sheffield Univ. (England). Dept. of Control Engineering.
SMITH PREDICTOR AND SELF-TUNING CONTROL OF MUSCLE RELAXANT DRUG ADMINISTRATION
D. A. LINKENS, M. MENAD, and A. J. ASBURY 1984 27 p refs
(RR-257) Avail: NTIS HC A03/MF A01

Control, dead-time compensation, and on-line identification and control were applied to relaxation management in anesthesia, in clinical trials using a dog. Closed-loop control gives insight into the classic pharmacokinetic compartmental modelling problem and provides a test environment capable of quantifying interacting effects from other drugs. Provided care is taken to jacket the self-tuner, self-tuning control of muscle relaxation is shown to be feasible, safe and efficient. As well as being a satisfactory control strategy in its own right, the Smith predictor structure, when used to provide jacketting, greatly improves system speed of response. Author (ESA)

N85-11535# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Hauptabteilung Strukturberechnung und -versuch, Akustik.

LOCOMOTION RESEARCH FOR THE ANALYSIS OF THE HUMAN GAIT AND FOR THE DETERMINATION OF THE MAXIMUM LOADS OF THE PELVIS-LEG SKELETON. VOLUME 1: TWO-DIMENSIONAL ANALYSIS Final Report, Mar. 1980

H. ROEHRLE, R. SCHOLTEN, C. SIGOLOTTO, and W. SOLLBACH Bonn Bundesministerium fuer Forschung und Technologie Nov. 1983 150 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie 2 Vol.

(BMFT-FB-T-83-187-VOL-1; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 31.50

A climbing test track for the determination of human locomotion and foot-ground forces during horizontal walking and step climbing was developed. The measurement information is furnished by an opto-electronic movement monitoring system, a multicomponent measuring platform, and an interference pattern sandwich platform. An optimization method program system to calculate the time-dependent muscle and joint forces is described. Sixteen subjects and 64 test runs, taking into account the gait velocity, the body height and weight were analyzed. The characteristics of the neutral gait and the joint forces in the pelvis-leg skeleton are shown. Author (ESA)

N85-11536# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Hauptabteilung Strukturberechnung und -versuch, Akustik.

LOCOMOTION RESEARCH FOR THE ANALYSIS OF THE HUMAN GAIT AND FOR THE DETERMINATION OF THE MAXIMUM LOADS OF THE PELVIS-LEG SKELETON. VOLUME 2: THREE-DIMENSIONAL ANALYSIS Final Report, Mar. 1981

H. ROEHRLE, C. SIGOLOTTO, and W. SOLLBACH Bonn Bundesministerium fuer Forschung und Technologie Nov. 1983 140 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie 2 Vol.

(BMFT-FB-T-83-188-VOL-2; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 29.50

Three-dimensional human locomotion during horizontal walking and climbing stairs was measured with a specially calibrated opto-electronic camera system. A multicomponent measuring platform was used to acquire the force components between foot and ground and the force application point. Measurements were carried out on 21 male and 5 female subjects for different gait speeds. A program system, based on an optimization method, was used to calculate time dependent and three-dimensional muscle and joint forces in the pelvis-leg skeleton. The maximum joint forces depending on gait speed, body weight and height are shown. It is shown that the three-dimensional analysis reveals clearly lower joint loads than the simplified plane consideration. Author (ESA)

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BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

A85-10404

SOME EFFECTS OF A COMBINED NOISE AND VIBRATION ENVIRONMENT ON A MENTAL ARITHMETIC TASK

J. SANDOVER (OLoughborough University of Technology, Loughborough, Leics., England) and D. F. CHAMPION (North Carolina State University, Raleigh, NC) Journal of Sound and Vibration (ISSN 0022-460X), vol. 95, July 22, 1984, p. 203-212. refs

A complex situation exists with respect to the interactive effects of noise and vibration on performance. The addition of the second stressor may reduce performance ('additive' interaction), it may improve performance ('subtractive' interaction), or it may have no effect. The present investigation is cognitive performance, taking into account the possibility that while noise and vibration acting independently might cause impairment of performance, offering them in combination at levels judged to be subjectively equal would lead to a lesser impairment. Three experiments were conducted. Each experiment involved a different intensity of vibration with concomitant changes in noise levels. In the experiments, the subjects had to solve arithmetic problems, while exposed to four different conditions. The significance of the results is discussed. G.R.

A85-11250

THE PSYCHODIAGNOSTICS OF HUMAN FUNCTIONAL STATES [PSIKHODIAGNOSTIKA FUNKTSIONAL'NYKH SOSTOIANII CHELOVEKA]

A. B. LEONOVA Moscow, Izdatel'stvo Moskovskogo Universiteta, 1984, 200 p. In Russian. refs

The objects and methods of a psychology of human functional states are explored with particular emphasis on the study of those emotional states which occur as the result of heavy or prolonged physical activity, stress, or boredom. Methods are developed for effectively measuring the dynamics of fatigue according to changes in the microstructure of known physiological processes, as well as the multidimensional changes in subjective symptoms. On the basis of a number of concrete examples, some principles are offered which can be applied toward the development of a program for the prophylaxis and correction of disorders caused by reactions to stress or boredom. I.H.

N85-10606# Japanese Air Self-Defense Force, Tokyo. Aeromedical Lab.

PSYCHOLOGICAL STATES (MOOD, AFFECT OR EMOTION) EXPERIENCED BY JASDF PILOTS THROUGH FLYING DUTIES. 3: FLYING CONDITIONS CAUSING PILOTS PSYCHOLOGICAL DISTURBANCES

M. OKAUE and H. ARUGA *In its* The Repts. of Aeromedical Lab., Vol. 25, No. 1/2 p 1-14 Jun. 1984 refs In JAPANESE; ENGLISH summary

Avail: NTIS HC A05/MF A01

A questionnaire, containing both open-ended questions and sentences completion forms, was administered to JASDF pilots for the purpose of clarifying what flying situations induce emotional disturbances such as anxiety, tension, and irritancy in pilots. The analysis of the pilot responses ae summarized below. More pilots seem to feel anxiety than tension under conditions of aircraft troubles, bad weather, their own poor experiences, or insufficient preparations for flight; however, they feel tension rather than anxiety during their normal mission flight. Many pilots feel tension during taking off or landing which are regarded as some of the greatest difficulties in flight. If one-seat flighter pilots, whose flying hours in currently assigned aircraft are under 150 hours, do not fly for a month, most of them feel anxiety at the time of flying. There are

aircraft which are felt to be easy or difficult to control. Whether an aircraft is felt to be easy or difficult supposedly does not depend upon a pilot's flying experience but upon characteristics of the aircraft. Irritancy during flight is experienced more by jet pilots including instructors and fighters than by rescue pilots. More fighter pilots experience solitude during flight than other multiple seat aircraft pilots. R.S.F.

N85-10608# Japanese Air Self-Defense Force, Tokyo. Aeromedical Lab.

THE RELATIONSHIP BETWEEN EMOTIONAL TENSION SCALE AND PSYCHOLOGICAL UNEASINESS OF JASDF PILOTS IN FLYING SITUATIONS

M. OKAUE and H. ARUGA *In its* The Repts. of Aeromedical Lab., Vol. 25, No. 1/2 p 31-46 Jun. 1984 In JAPANESE; ENGLISH summary

Avail: NTIS HC A05/MF A01

A questionnaire to survey JASDF pilot's emotional experiences through flying duty assessment and the Emotional Tension Scale was administered to 173 JASDF pilots. The Emotional Tension Scale is a questionaire to evaluate emotional tensions or anxieties which are supposed to effect behaviors in frustrating situations. The questions about flting situations consisted of multiple choice and sentence completion type. Answers given by the pilots were converted to Z scores, and Pearson's product moment correlation coefficients were computed. Results suggest that: (1) younger pilots tend to be less stable psychologically; (2) the Emotional Tension Scale cannot be used to project pilot psychological uneasinesses in actual flying; (3) the Emotional Tension Scale score is related to the frequency of reluctancy to fly and the uneasiness before flying; (4) question items inquiring of phobic tendencies and physical complaints in the Scale have significant correlation with the frequency of reluctancy to fly; and those of obsessive tendencies and of social phobic tendencies slightly correlate with the psychological uneasiness before flying; and (5) phobic experiences during flying have no relations with any other item, therefore every pilot has the possibility to have such experiences, regardless of his age, flight hours, or psychological traits. R.S.F.

N85-10644# National Inst. for Personnel Research, Johannesburg (South Africa). Div. of Neuropsychology.

PATTERN REVERSAL VISUAL EVOKED POTENTIALS AND REACTION TIME

B. R. MALLINSON and B. D. MURDOCH Braamfontein, South Africa May 1983 24 p refs

(CSIR-SR-PERS-354; ISBN-0-7988-2345-3) Avail: NTIS HC A02/MF A01

The relationship between simple reaction time (RT) and the pattern-reversal visual evoked potential (PRVEP) and the effect of changes of arousal level on the latter were studied in 17 subjects. Results show increased P100 amplitude and decreased latency with increased arousal. The RT was correlated with P100 latency but not with amplitude. Differences between results and those obtained using flash VEPs are discussed. R.S.F.

N85-10645# Council for Scientific and Industrial Research, Pretoria (South Africa).

PSYCHOLOGICAL TESTING ON THE COMPUTER

T. R. TAYLOR 1982 36 p Presented at Assoc. Sci. and Tech. Soc. of South Africa, Pretoria, 28 Sep. 1982

(R/PERS-618) Avail: NTIS HC A03/MF A01

The National Institute for Personnel Research (NIPR) is in the process of developing a computerized psychological testing system. The programs developed for the system are divided into four categories: the control programs, the tests, test manuals and statistical procedures. The advantages and disadvantages of computerized testing are discussed. Some of the main features of NIPR computerized tests are described. Finally, one of the tests, the Arithmetic Reasoning Test, is described in some detail to illustrate the type of testing material which is being programmed on the system. Author

N85-10646# California Univ., San Diego, La Jolla. Inst. for Cognitive Science.

FEATURE DISCOVERY BY COMPETITIVE LEARNING

D. E. RUMELHART and D. ZIPSER Jun. 1984 54 p

(Contract N00014-79-C-0323)

(AD-A145052; ICS-8407) Avail: NTIS HC A04/MF A01 CSCL 05J

This paper reports the results of our studies with an unsupervised learning paradigm which we have called Competitive Learning. We have examined competitive learning using both computer simulation and formal analysis and have found that when it is applied to parallel networks of neuron-like elements, many potentially useful learning tasks can be accomplished. How a very simple competitive mechanism can discover a set of feature detectors which capture important aspects of the set of stimulus input patterns. How these feature detectors can form the basis of a multi-layer system that can serve to learn categorizations of stimulus sets which are not linearly separable. How the use of correlated stimuli can be served as a kind of teaching input to the system to allow the development of feature detectors which would not develop otherwise. Competitive learning is an essentially non-associative statistical learning scheme. We certainly imagine that other kinds of learning mechanisms will be involved in the building of associations among patterns of activation in a more complete neural network. GRA

N85-10647# Denver Research Inst., Colo.

SELF-PACED INSTRUCTION. FACTORS CRITICAL TO IMPLEMENTATION IN AIR FORCE TECHNICAL TRAINING: A PRELIMINARY INQUIRY Final Technical Paper May - Sep. 1982

B. L. MCCOMBS, S. M. BACK, and A. S. WEST Aug. 1984 109 p

(Contract F33615-81-C-0007)

(AD-A145098; AFHRL-TP-84-23) Avail: NTIS HC A06/MF A01 CSCL 05I

Self-paced training in the Air Force has not met with the success that had been anticipated from the controlled experiments with self-pacing reported in both the civilian and military literature. The reasons for this lack of wide-scale success were systematically investigated to identify those factors that are critical to the success of the self-paced course. Administrative and instructional factors were hypothesized from a review of the literature and were investigated through case studies of 12 courses at four Air Force technical bases. The results of this study show that it is not one but a combination of factors that primarily influences success and that management factors are more important in Air Force technical training than in the training reported in the general literature. Based on a success model generated by the study, six recommendations are provided for enhancing the successful implementation of self-paced instruction. Author (GRA)

N85-10648# Denver Research Inst., Colo.

FACTORS CRITICAL TO THE IMPLEMENTATION OF SELF-PACED INSTRUCTION: A BACKGROUND REVIEW Final Technical Paper May - Dec. 1982

S. M. BACK and B. L. MCCOMBS Aug. 1984 61 p

(Contract F33615-81-C-0007)

(AD-A145143; AFHRL-TP-84-24) Avail: NTIS HC A04/MF A01 CSCL 05I

In a previous effort the literature pertaining to self-paced instruction was initially collected and reviewed to support a study of factors associated with the successful utilization of self-paced instruction in Air Force technical training. The purpose of this technical paper is to provide a more in-depth analysis of the literature relevant to the findings of that study. In general, the analysis of the literature revealed a high level consensus among military and civilian reports with respect to factors associated with successful implementation of self-paced instruction. GRA

N85-10649# Oregon Univ., Eugene. Dept. of Psychology.
COGNITIVE SCIENCE PROGRAM. A FRAMEWORK FOR RELATING COGNITIVE TO NEURAL SYSTEMS Final Report
M. I. POSNER 15 Aug. 1984 42 p
(Contract N00014-83-K-0601; NR PROJ. 667-523)
(AD-A145185; TR-84-2; ONR-84-1) Avail: NTIS HC A03/MF A01 CSCL 05J

This paper outlines a framework for relating cognitive activities of daily life (typing, reading) to underlying neural systems. The framework uses five levels of analysis. These are as follows: task, elementary operations, components facilitation and inhibition, neural systems and cellular level. Evidence is outlined which supports the idea that component facilitations and inhibitions in performance can be systematically linked to the activity of neural populations. The evidence is in the area of spatial attention and uses results of normals and patients as well as data from surface EEG and recording of single cells during selective attention tasks. GRA

N85-10650# Oregon Univ., Eugene.
NEURAL CONTROL OF THE DIRECTION OF COVERT VISUAL ORIENTING Final Technical Report
M. I. POSNER, J. WALKER, F. J. FRIEDRICK, and R. D. RAFAL 15 Aug. 1984 27 p Prepared in cooperation with Good Samaritan Hospital and Medical Center, Portland, Oreg. Sponsored in part by NIMH Submitted for publication
(Contract N00014-83-K-0601; NR PROJ. 667-523)
(AD-A145189; TR-84-4; ONR-84-3) Avail: NTIS HC A03/MF A01 CSCL 05J

In cases of unilateral parietal damage patients have difficulty in handling stimuli contralateral to the lesion. Our study shows a major problem is in disengaging attention from its current focus to deal with targets in a contralateral direction irrespective of the visual field in which the target occurs. This is true for both right and left-sided lesions. It is likely that the visual field and thus the hemisphere which first receives the target information is also important, but that is not clear in our results. The study confirms a suggestion by Kinsbourne (1977) that each hemisphere directs attention in a contralateral direction. It implies that for directing attention the two hemispheres must be constantly interchanging control and thus sharing information from the two hemifields. These studies suggest the importance of control of the location of covert attention prior to the assessment of lateralization of cognitive functions. GRA

N85-10651# Oklahoma Univ., Norman. School of Industrial Engineering.
WORKLOAD DEMAND AND CNS DEPRESSANT STRESSOR EFFFECTS ON SPATIAL ORIENTATION INFORMATION PROCESSING Final Scientific Report, 1 Apr. 1983 - 31 Mar. 1984
R. E. SCHLEGEL Jul. 1984 77 p Prepared in cooperation with Southeastern Center for Electrical Engineering Education, St. Cloud, Fla.
(Contract F49620-82-C-0035; AF-AFOSR-0181-83; AF PROJ. 2313)
(AD-A145211; AFOSR-84-0759TR) Avail: NTIS HC A05/MF A01 CSCL 05J

An important element of piloting high-performance jet aircraft is the human ability to perform spatial orientation information processing, particularly when it involves the use of video display instrumentation. Spatial disorientation has consistently been the cause of numerous accidents throughout the history of flight. A study was conducted to further evaluate the Manikin Task, a complex reaction time task previously developed by the RAF as a test of spatial orientation. The objectives of the study were to (1) thoroughly evaluate the training characteristics of the task including variation in performance related to individual stimuli characteristics, (2) determine the task's speed vs. accuracy tradeoff characteristics, and (3) assess performance on the task under the influence of ethyl alcohol. Response times and accuracy were measured on five subjects under various conditions over a five-week period. Analysis of the data indicated a substantial dependence of response times on certain stimuli characteristics. In addition, there was a definite decline in accuracy corresponding to a forced decrease in response time. However, the relationship could not be adequately represented by the proposed speed-accuracy tradeoff functions. The effect of alcohol was evidenced primarily by a change in the slope if the speed-accuracy tradeoff relationship. GRA

N85-10652# Oregon Univ., Eugene. Dept. of Psychology.
INHIBITION OF RETURN: NEURAL BASIS AND FUNCTION Final Report
M. I. POSNER, R. D. RAFAL (Roger Williams Hospital, Providence, R.I.), L. S. CHOATE, and J. VAUGHAN (Clinton Coll., Hamilton, N.Y.) 15 Aug. 1984 48 p
(Contract N00014-83-K-0601; NR PROJ. 667-523)
(AD-A145242; ONR-84-3; ONR-84-2) Avail: NTIS HC A03/MF A01 CSCL 05J

A goal of neuropsychology is to connect cognitive functions with underlying neural systems. Posner (in press) has proposed a framework for doing so in which elementary mental operations in cognitive models are expressed in terms of component facilitations and inhibitions in the performance domain. These components are in turn linked to underlying neural systems. In the area of spatial attention one such component is the tendency to inhibit orienting toward visual locations which have been previously attended (inhibition of return). The current studies use patients and normals to demonstrate the relationship of this component to systems which generate saccades. These mid-brain systems appear to contribute specific components to the generation of programs for visual attention. The deficits found in patients and the conditions under which the inhibition is found in normals suggest that inhibition of return may function to favor foveation of information at new locations. GRA

N85-10653# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
COMPREHENSION OF INSTRUCTIONS FOR OPERATING DEVICES Technical Report, 1 Jul. 1983 - 30 Jun. 1984
K. T. SPOEHR, M. E. MORRIS, and E. E. SMITH Aug. 1984 35 p
(Contract N00014-83-C-0446; NR PROJ. 154-461)
(AD-A145263; BBN-5712; TR-3) Avail: NTIS HC A03/MF A01 CSCL 05I

Two experiments assess the processes by which written instructions for operating a piece of equipment are comprehended. Experiment 1 shows that comprehension is fastest when information on the action is to be performed, the consequences of the action, and the conditions under which it is to be performed, match the order in which it is needed to fill in a schema for executing the instruction. Experiment 2 shows that subjects use a step schema for organizing the reading process even when the material is to be read and recalled verbatim instead of being executed. Author (GRA)

N85-11537# Lincoln Lab., Mass. Inst. of Tech., Lexington.
AIR-TO-AIR VISUAL ACQUISITION PERFORMANCE WITH TCAS 2
J. W. ANDREWS 7 Nov. 1984 44 p refs
(Contract F19628-85-C-0002; DOT-FA77WAI-817)
(FAA-PM-84-17; ATC-130) Avail: NTIS HC A02/MF A01

The ability of pilots to visually acquire aircraft approaching on collision courses is analyzed using a mathematical model of visual acquisition. The model is calibrated by reference to subject pilot flight test data resulting from testing of the Traffic Alert and Collision Avoidance System (TCAS). Techniques are presented that allow the determination of the probability of visual acquisition for a range of intruder aircraft sizes and closing rates. The effect of visual range (atmospheric visibility) upon visual acquisition performance is analyzed. Author

N85-11538# Oregon Univ., Eugene. Dept. of Computer and Information Science.
VISUAL REPRESENTATIONS SUBSERVING TEXTURE PERCEPTION Annual Report, 30 Apr. 1983 - 1 May 1984
J. BECK and K. A. STEVENS 23 May 1984 15 p
(Contract F49620-83-C-0093)
(AD-A145412; AFOSR-84-0753TR; AR-1) Avail: NTIS HC A02/MF A01 CSCL 05J

The ongoing research investigates the representations of visual texture and the processes that detect discontinuities and structure in visual texture. Psychophysical experiments have investigated the salience of bar orientation and the effect of groupings in texture segmentation. We are examining the role of elongated receptive field mechanisms in computing both local measures of orientation and their possible role in texture segmentation. We have found such mechanisms, however, to be less appropriate for determining one-dimensional groupings of (collinear) discrete items of texture. Combined psychophysical and computational studies have provided evidence for place tokens in groupings, and current work is directed towards understanding how these tokens may be defined in fine-scale texture detail. To support this work, a vision laboratory has been established based on a Symbolics 3600 Lisp Machine.
Author (GRA)

N85-11539# Logicon, Inc., San Diego, Calif.
AIRBORNE PERFORMANCE MEASUREMENT SYSTEM DESIGN: C-5 AIRCRAFT Final Report, Feb. 1983 - Jan. 1984
N. J. BARMATZ, T. R. DANIELL, R. LOMBARD, C. F. SCHMITT, and W. L. WAAG Aug. 1984 127 p
(Contract F33615-83-C-0025)
(AD-A145436; AFHRL-TR-84-13) Avail: NTIS HC A07/MF A01 CSCL 05I

This study identified and defined the required functional capabilities of an airborne performance measurements system for the C-5 aircraft. The requirements of the airborne PMS were defined to satisfy both research and training needs. A mission equivalent to the nominal mission utilized in the C-5 flight simulator PMS was defined. The C-5 aircraft signals that can be extracted to support the performance measurement of this mission were identified. From this a series of design approaches for an airborne PMS was developed. A system design specification was produced for an airborne PMS system selected from these design approaches. GRA

N85-11540# Harvard Univ., Cambridge, Mass. Dept. of Psychology.
TOWARD A COMPUTATIONAL NEUROPSYCHOLOGY OF HIGH-LEVEL VISION Interim Report
S. M. KOSSLYN 20 Aug. 1984 46 p
(Contract N00014-82-C-0166; N00014-83-K-0095)
(AD-A145711; TR-3) Avail: NTIS HC A03/MF A01 CSCL 06P

Visual information processing in humans was studied from three distinct perspectives. This paper develops a way of melding the approaches of Artificial Intelligence, Cognitive Psychology, and Neuropsychology, and explores the advantages of such a hybrid approach. Each of the individual approaches has its strengths and weaknesses, but these are different for the different approaches. It is argued in this paper that by combining the three, we are in a position to take advantage of each one's strengths and may be able to circumvent each one's weaknesses. Additional keyword topics include mental imagery and computer models.
GRA

N85-11541# Nova Technical, Inc., Tarzana, Calif.
AN INVESTIGATION OF THE USE OF STEADY-STATE EVOKED POTENTIALS FOR HUMAN PERFORMANCE AND WORKLOAD ASSESSMENT AND CONTROL Annual Report, 15 Jun. 1983 - 14 Jun. 1984
S. L. MOISE, JR. 14 Jun. 1984 20 p
(Contract F49620-83-C-0102)
(AD-A145727; AFOSR-84-0770TR) Avail: NTIS HC A02/MF A01 CSCL 05J

This report describes the status of this AFOSR sponsored research program during the reporting period. This research program is designed to examine high frequency (40-60 Hz) Steady-State Evoked Potentials as a tool for providing information about human sensory and performance capability. In particular, a measure of relative transmission time through the visual system is to be evaluated. This report details the configuration of the test and data collection facility and reports the results of control and pilot studies. Some of this data suggests that there may be a frequency masking effect in the visual system when multiple visual frequencies are simultaneously presented. If this is verified, it may represent a previously unobserved basic property of the visual system response to flashing stimuli. GRA

N85-11542# Rice Univ., Houston, Tex. Dept. of Psychology.
THE EFFECTS OF FEEDBACK AND PREDICTABILITY OF HUMAN JUDGMENT
B. S. GOLDSBERRY Aug. 1984 167 p
(Contract N00014-82-C-0001)
(AD-A145744; AD-E001749; TR-84-3) Avail: NTIS HC A08/MF A01 CSCL 05J

Previous research has found that when subjects are given cognitive feedback, they reach higher levels of achievement than when they are given outcome feedback. It was hypothesized that this finding was due in part to the predictability of the task environment since outcome feedback is at a distinct disadvantage as a sole means of conveying such information. A study was conducted to compare response and outcome feedback under three predictability conditions. The design included a control group receiving no feedback at all, two response groups differing in precision of feedback information, and two outcome feedback groups differing on a quantity dimension. The study also attempted to clarify the definition of feedback and to equate the availability of task information in the various feedback conditions that were compared. Contrary to expectations, the utility of outcome feedback was inferior to that of response feedback under all three predictability conditions tested. In fact, an interaction revealed that the effect of increased predictability raised rather than lowered the disparity between outcome and response feedback performance. The results also revealed that a control group receiving no feedback at all performed as well as or better than those with feedback when the availability of task information was equated. Moreover, eliminating the memory requirement inherent in the use of outcome feedback only worsened performance. Similarly, adding precision to the response feedback condition beyond the level of mere directional error information did not improve performance. GRA

N85-11543# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.
USING GROSS OUTLINE FEATURES IN LONG RANGE TARGET IDENTIFICATION
B. MODEER Jun. 1984 21 p refs In SWEDISH; ENGLISH summary
(FOA-C-53018-H2; ISSN-0347-7665) Avail: NTIS HC A02/MF A01

Distance effects on the use of gross features to identify target silhouettes were studied. Silhouette pictures of three vehicles and three rectangles of corresponding size and form were shown on black and white slides. Four simulated ranges between 3 and 6 km were used; 12 subjects made 480 observations each. Length-to-width ratio of the targets is important for identification up to 6000 m. It is possible to distinguish outline features at ranges which correspond to the resolution limit of the eye. The

composition of the target set with regard to similarity between the targets has a great influence on the performance. Author (ESA)

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

A85-10630
LIMITATIONS OF SPATIAL-FREQUENCY-BASED CRITERIA FOR ASSESSMENT OF RASTER DISPLAY SYSTEMS
I. OVERINGTON (British Aerospace PLC, Dynamics Group, Bristol, England) IN: Optical system design, analysis, and production; Proceedings of the Meeting, Geneva, Switzerland, April 19-22, 1983 . Bellingham, WA, SPIE - The International Society for Optical Engineering, 1983, p. 34-42. refs

A new approach, based on knowledge of early image processing in the human visual system, is developed for taking into account raster effects on the visual function. A highly controlled experiment has demonstrated some acute nonlinearities and a large fall-off of performance with over-large display subtenses. It is found that the anticipated effects predicted from knowledge of the early neural function appear largely to explain the experimental results. It is concluded that the reassessment of spatial-frequency-based performance measures such as the MRTD (minimum resolvable temperature difference) and MRC (minimum resolvable contrast) in the light of these results suggests that caution should be exercised in the use of such measures. B.J.

A85-10738* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
HUMAN FACTORS IN AIRCRAFT INCIDENTS - RESULTS OF A 7-YEAR STUDY (ANDRE ALLARD MEMORIAL LECTURE)
C. E. BILLINGS and W. D. REYNARD (NASA, Ames Research Center, Man-Vehicle Systems Research Div., Moffett Field, CA) (International Congress of Aviation and Space Medicine, 31st, Amsterdam, Netherlands, Sept. 9, 1983) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 55, Oct. 1984, p. 960-965. refs

It is pointed out that nearly all fatal aircraft accidents are preventable, and that most such accidents are due to human error. The present discussion is concerned with the results of a seven-year study of the data collected by the NASA Aviation Safety Reporting System (ASRS). The Aviation Safety Reporting System was designed to stimulate as large a flow as possible of information regarding errors and operational problems in the conduct of air operations. It was implemented in April, 1976. In the following 7.5 years, 35,000 reports have been received from pilots, controllers, and the armed forces. Human errors are found in more than 80 percent of these reports. Attention is given to the types of events reported, possible causal factors in incidents, the relationship of incidents and accidents, and sources of error in the data. ASRS reports include sufficient detail to permit authorities to institute changes in the national aviation system designed to minimize the likelihood of human error, and to insulate the system against the effects of errors. G.R.

A85-11084
ROBUST CONTROL OF BILATERAL FORCE-REFLECTING MANIPULATORS
T. M. ABDEL-RAHMAN (University of Qatar, Doha, Qatar) IN: Modeling and simulation. Volume 14 - Proceedings of the Fourteenth Annual Pittsburgh Conference, Pittsburgh, PA, April 21, 22, 1983. Parts 1-2 . Research Triangle Park, NC, Instrument Society of America, 1983, p. 495-501.

A control-system design method for Bilateral-Force Reflecting master-slave type manipulators is given. A very wide range of sensor signals are considered. A systematic procedure for selecting the control gains that yield a robust control system and improve the performance is described. Two systems employing electromechanical and electrohydraulic joints were built. The controllers employ a nonlinear control technique known as Bidirectional Pulse-Frequency Pulse-Width or Two-State modulation to improve the Force Feedback characteristics. A linearized model for the nonlinear controller has been used in analysis. Control gains were implemented. Results obtained verified the design approach and highlighted areas for improvements. Author

A85-11739
CONTACT LENSES AND FLYING [LENTILLES DE CONTACT ET PILOTAGE]
G. R. CAHUZAC (Journee Regionale de Medecine Aeronautique Clinique, Marseille, France, Sept. 30, 1983) Medecine Aeronautique et Spatiale, vol. 23, 3rd Quarter, 1984, p. 247-249. In French.

The problems and benefits gained with contact lenses worn by nonmilitary pilots are described. Lenses are either hard or soft, hydrophyillic and thin. Gas permeability is necessary to allow the cornea to receive its required 7 microliters/sq cm per hr dose of O2. High altitude flying further reduces the availability of O2. Microscopic lesions can also occur in the cornea in hypoxic conditions. Contact lenses increase the FOV for a pilot compared to glasses with rims, and do not steam up. Furthermore, contact lenses are not displaced during accelerations up to 6 g. High altitude flight, even if the cabin is pressurized, pose the problems of dryness of the air, the formation of gas bubbles under the lens, and may encourage the removal of the lenses for the duration at high altitudes. M.S.K.

A85-12166
EVALUATION OF RESPONSES TO BROAD-BAND WHOLE-BODY VIBRATION
A. MEISTER, D. BRAEUER, A.-M. METZ, R. MUCKE, R. ROTHE, H. SEIDEL (Zentralinstitut fuer Arbeitsmedizin, Berlin, East Germany), N. N. KUREROV, I. A. STAROZUK, and G. A. SUVOROV (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) Ergonomics (ISSN 0014-0139), vol. 27, Sept. 1984, p. 959-980. refs

Experimental results of an investigation of the human response to different types of broad-band whole body vibration (WBV) are reported. Six male subjects were subjected to sinusoidal and octave-band wide vibration in a number of different frequencies, intensities and directions. Subjective judgments of severity were used to measure response, as well as bioelectrical measurements of trunk muscle activity, transmissibility, and impedance. It is found that human response in the range of frequencies near 4 Hz was more pronounced than at other frequencies. The bioelectrical data show a nonlinearity for the WBV levels of intensity, and the patterns of the biomechanical reactions depended on both anatomical and exposure conditions. The individual responses in discriminating the exposure conditions are found to agree, but the extent of the agreement between individual responses varied for the effects investigated. I.H.

A85-12375
JET SHOES AND ROCKET PACKS - THE DEVELOPMENT OF ASTRONAUT MANEUVERING UNITS
G. P. KENNEDY (National Air and Space Museum, Washington, DC) Space World (ISSN 0038-6332), vol. U-10-250, Oct. 1984, p. 4-9.

A development history is presented for maneuvering devices designed to facilitate astronaut extravehicular activity (EVA) undertaken to supply, inspect, repair, service, and assemble spacecraft in orbit. Rotation, translation, and stabilization should be provided by such astronaut maneuvering units (AMUs). The earliest AMU was tested during the first America EVA on June 3, 1965; it employed as propellant the oxygen from two 4000-psi Gemini ejection seat oxygen bottles. The Skylab program subsequently offered the next major opportunity to test AMU designs, in the form of both backpack and hand-held maneuvering hardware and a Foot Controlled Maneuvering unit, or 'jet shoe'.

The Spaced Shuttle crew's Manned Maneuvering Unit is hand-controlled, and employs pressurized nitrogen gas as a propellant. O.C.

N85-10049*# California Univ., Davis. Dept. of Ophthalmology.
STIMULUS FACTORS IN MOTION PERCEPTION AND SPATIAL ORIENTATION
R. B. POST and C. A. JOHNSON *In* NASA. Dryden Flight Research Center Peripheral Vision Horizon Display (PVHD) p 57-62 Apr. 1984 refs
Avail: NTIS HC A07/MF A01 CSCL 05H

The Malcolm horizon utilizes a large projected light stimulus Peripheral Vision Horizon Device (PVHD) as an attitude indicator in order to achieve a more compelling sense of roll than is obtained with smaller devices. The basic principle is that the larger stimulus is more similar to visibility of a real horizon during roll, and does not require fixation and attention to the degree that smaller displays do. Successful implementation of such a device requires adjustment of the parameters of the visual stimulus so that its effects on motion perception and spatial orientation are optimized. With this purpose in mind, the effects of relevant image variables on the perception of object motion, self motion and spatial orientation are reviewed. Author

N85-10050*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE PERIPHERAL VISUAL CUE ASSESSMENT FACILITY AT AMES RESEARCH CENTER
R. F. HAINES *In* NASA. Dryden Flight Research Center Peripheral Vision Horizon Display (PVHD) p 63-70 Apr. 1984 refs
Avail: NTIS HC A07/MF A01 CSCL 05H

The Peripheral Visual Cue Assessment Facility was established to study various responses to controlled dynamic stimuli that could be considered as visual analogs of some real world counterparts such as the horizon. Careful stimulus control permits specific responses to be traced to specific stimulus dynamics. The ability of the visual system to assess various kinds of stimulus motion is examined. A major emphasis is placed upon the peripheral vision field, which plays an important role in a pilot's assessment of where he is in space, where he is going, how fast he is travelling, and what angular and linear rates of movement is taking place. The facility was designed to be able to carry out carefully controlled psychophysical vision research over a wide angular range. E.R.

N85-10609# Japanese Air Self-Defense Force, Tokyo. Aeromedical Lab.
ASSESSMENT OF THE INFLATING CHARACTERISTICS OF THE MODIFIED ANTI-G SUIT
A. ONOZAWA, W. OGAWA, S. OGATA, M. OSHIBUCHI, M. ONO, and M. IWANE *In its* The Repts. of Aeromedical Lab., Vol. 25, No. 1/2 p 47-64 Jun. 1984 refs In JAPANESE; ENGLISH summary
Avail: NTIS HC A05/MF A01

A modified anti-G suit developed in light of rapid onset G rates was made. The inflating characteristics of the modifid anti-G suit were assessed by human centrifuge test, ground test, and flight test. According to the measurement of inflation time, change of inner pressure, and pressure error score in each bladder, the modified anti-G suit responded to the rapid onset G rate. Human subjects could not distinguish between the inflating characteristics between a JASDF standard suit and a modified suit. The modified anti-G inflates with a rapid velocity of inner pressure of each bladder without differences between inner pressure of ech bladder and outer pressure to the body surface. The modified suit inflates smoothly without any unbalance. According to pilots' comments, the modified suit was superior in fitness, but no differences in G-tolerance between the standard and the modified one were reported. In conclusion, it is necessary to develop a ready pressure valve and new anti-G systems for enhancement of G-tolerance of the fighter pilots. R.S.F.

N85-10631# Joint Publications Research Service, Arlington, Va.
TOXICOLOGICAL EVALUATION OF COLUMBIA SPACECRAFT
W. J. RIPPSTEIN and M. E. COLEMAN *In its* USSR Rept.: Space Biol. and Aerospace Med., Vol. 18, No. 4, Jul. - Aug. 1984 (JPRS-USB-84-006) p 126-138 2 Oct. 1984 refs Transl. into ENGLISH from Kosmich. Biol. i Aviakosmich. Med. (Moscow), v. 18, no. 4, Jul. - Aug. 1984 p 87-96
Avail: NTIS HC A07

Atmospheric contamination of spacecraft crew cabins has been a toxicological concern since the United States began its efforts in manned spaceflight. Procedures were developed and utilized for determining the identities and quantities of contaminant gases present in the crew cabin environment. Methods were also developed for assessing and controlling the trace gas contaminant buildup within the closed environment of spacecraft cabins. Although nearly one hundred contaminant gases were detected in the shuttle crew cabin, for the most part, the concentrations of these gases were maintained below a toxicity hazard level. Author

N85-10654 Prins Maurits Lab. TNO, Rijswijk (Netherlands).
ULTRAFILTRATION AS PRETREATMENT FOR THE PREPARATION OF DRINKING WATER BY REVERSE OSMOSIS ONBOARD SHIPS [ULTRAFILTRATIE ALS VOORBEHANDELING VOOR DE BEREIDING VAN DRINKWATER DOOR OMGEKEERDE OSMOSE AAN BOORD VAN SCHEPEN]
I. DEVRIES and S. C. VANSWIETEN Dec. 1983 64 p refs In DUTCH; ENGLISH summary
(Contract A81/KM/148)
(PML-1984-32; TDCK-79376) Avail: Issuing Activity

Reverse osmosis desalination of sea water was investigated in order to develop a low power, reliable, simple, compact and completely automated system for the preparation of drinking water onboard naval ships. Tubular, spiral wound and hollow fiber membrane configuration ultrafiltration systems were compared. Membrane surface area required to produce a constant flow as feed prior to the reverse osmosis process was studied. The three systems are suitable for pretreatment. The quality of the water guarantees an undisturbed functioning of the reverse osmosis process. Fouling of the reverse osmosis membranes by undissolved particles, including bacteria and viruses, does not occur. The tubular and spiral wound systems are the most suitable. Author (ESA)

N85-10655# Navy Clothing and Textile Research Unit, Natick, Mass.
THE EXPERIMENTAL MOD 3 FIREFIGHTERS' ALUMINIZED CRASH-RESCUE, FIRE-PROXIMITY HOOD Final Report
H. P. WINER Jul. 1984 15 p
(AD-A144993; NCTRF-154) Avail: NTIS HC A02/MF A01 CSCL 06Q

The Navy Clothing and Textile Research Facility (NCTRF) has developed the experimental Mod III Firefighters' Aluminized Crash-Rescue Fire-Proximity Hood, which improves upon the standard firefighters' aluminized hood (MIL-H-29144). Reports from the firefighting community have indicated that the standard hood is not compatible with the current self-contained breathing apparatus. To allow for the self-contained breathing apparatus, a new aluminum frame with a greater front radius has been developed, and a liftup visor with an enlarged area for improved vision and voice communications has been incorporated in the experimental hood. This visor also reduces fogging of the face shield. Also, a bib is attached to the front to serve as a protective flap over the vacuum-deposited gold-coated facepiece when the hood is not being worn. NCTRF has conducted a service evaluation of the experimental Mod III hood. As a result of this evaluation, NCTRF recommends the adoption of the Mod III hood with a two-piece, adjustable chinstrap. GRA

N85-10656# Army Aeromedical Research Lab., Fort Rucker, Ala.
ANTHROPOMETRIC COCKPIT COMPATIBILITY ASSESSMENT OF US ARMY AIRCRAFT FOR LARGE AND SMALL PERSONNEL WEARING A TRAINING, WARM-WEATHER CLOTHING CONFIGURATION Final Report
A. W. SCHOPPER and D. O. COTE Jul. 1984 52 p
(AD-A145208; USAARL-84-10) Avail: NTIS HC A04/MF A01 CSCL 01C

To assess physical aviator-cockpit reach compatibilities, eight small subjects 146.9 to 162.5 cm in stature and eight tall subjects 182.3 to 194.5 cm in stature were placed in the cockpits of all current US Army helicopters (except AAH-64) and fixed-wing aircraft. Subjects were dressed in the warm weather training uniform of US Army aviators and were requested to operate all primary controls and instructor-pilot designated critical switches, knobs, etc., with the shoulder harness in the unlocked position. Helmeted head clearance also was evaluated. Among several candidate measures of upper- and lower-body reach capabilities, total arm reach (span), and crotch height, respectively, were found to be the most efficient discriminators between those who could and those who could not perform all critical operational reaches. Sitting height was employed to assess helmeted head clearance. Substantial variation was encountered in the reach-related demands for different aircraft. Minimum total arm-reach requirements throughout the fleet ranged from 147 to 168 cm; minimum crotch-height requirements ranged from 69 to 78 cm. Three aircraft could not accommodate a sitting height above 102 cm. Very large personnel experienced difficulty in achieving full lateral cyclic and stick movement in several aircraft. GRA

N85-11544*# Virginia Polytechnic Inst. and State Univ., Blacksburg.
DECISION TREE RATING SCALES FOR WORKLOAD ESTIMATION: THEME AND VARIATIONS Final Report, 1 Feb. 1983 - 14 Mar. 1984
W. W. WIERWILLE, J. H. SKIPPER, and C. A. RIEGER (Hughes Aircraft Co., Fullerton, Calif.) 14 Mar. 1984 14 p refs
(Contract NAG2-17)
(NASA-CR-174062; NAS 1.26:174062) Avail: NTIS HC A02/MF A01 CSCL 05H

The Modified Cooper-Harper (MCH) scale which is a sensitive indicator of workload in several different types of aircrew tasks was examined. The study determined if variations of the scale might provide greater sensitivity and the reasons for the sensitivity of the scale. The MCH scale and five newly devised scales were examined in two different aircraft simulator experiments in which pilot loading was treated as an independent variable. It is indicated that while one of the new scales may be more sensitive in a given experiment, task dependency is a problem. The MCH scale exhibits consistent senstivity and remains the scale recommended for general use. The MCH scale results are consistent with earlier experiments. The rating scale experiments are reported and the questionnaire results which were directed to obtain a better understanding of the reasons for the relative sensitivity of the MCH scale and its variations are described. E.A.K.

N85-11545# Naval Aerospace Medical Research Lab., Pensacola, Fla.
DEVELOPMENT AND EVALUATION OF A PERFORMANCE-BASED TEST OF SACCADIC AND VESTIBULO-OCULAR CONTROL Summary Report
L. C. PERCIVAL and F. E. GUEDRY, JR. 16 Jan. 1984 61 p
(Contract MR00001)
(AD-A145367; NAMRL-1306) Avail: NTIS HC A04/MF A01 CSCL 06P

Acquisition of visual information from spatial points disparate enough to necessitate head and eye movement involves the vestibular and other oculo-motor control systems in shifting and stabilizing gaze relative to those points. In the present study a simple procedure to test oculomotor abilities was developed and evaluated; it uses performance to establish initial gaze position and to insure the required gaze shift and stabilization is rapidly produced. Performance in three experiments was consistently and powerfully influenced by stimulus exposure duration, and to a lesser extent by the size of the required gaze shift. The performance of normal subjects in eye movement and head-and-eye movement conditions is quite predictable from static performance of normals. There were two main conclusions: 1) The powerful effect of exposure time on performance suggests that the procedure will be sensitive to certain types of central nervous system and vestibular pathology. 2) Variation in performance characteristics implies that the procedure may be sensitive to individual differences in oculomotor abilities. Author (GRA)

N85-11546# Albany International Corp., Dedham, Mass.
RESISTANCE OF NAVY SHIPBOARD OUTERWEAR GARMENTS AND FIRE-RESISTANT FABRICS TO EXTREME HEAT Final Technical Report, 18 Jan. 1982 - 4 Dec. 1983
M. M. SCHOPPEE, J. M. WELSFORD, and N. J. ABBOTT Dec. 1983 138 p
(Contract N00140-82-C-BD00)
(AD-A145414; NCTRF-153) Avail: NTIS HC A07/MF A01 CSCL 06Q

The heat protective capabilities of a variety of fabrics used in Navy Shipboard outerwear garments have been characterized in several ways. Fabric tensile strength retention during short-term exposure to bilateral radiant heat at fluxes to 0.8 cal/sq cm sec, time-to-ignition at bilateral radiant fluxes to 1.1 cal/sq cm/sec, and the level of heat transferred to an underlying surface as the result of unilateral radiation to 1.25 cal/sq cm/sec and flame exposure at 2.2 cal/sq cm/sec have all been measured. Thirty-six single-layer fabrics and fabric assemblies have been used in the investigation ranging in weight from 3 to 25 oz/sq yd. Fabric materials tested include cotton, wool, modacrylic, Nomex, Kevlar, PAN, corespan semi-carbon/Kevlar, coated fabrics and various blends. GRA

N85-11547# Army Agency for Aviation Safety, Fort Rucker, Ala.
ANTHROPOMETRIC COCKPIT COMPATIBILITY ASSESSMENT OF US ARMY AIRCRAFT FOR LARGE AND SMALL PERSONNEL WEARING A COLD WEATHER, ARMORED VEST, CHEMICAL DEFENSE PROTECTIVE CLOTHING CONFIGURATION Final Report
D. O. COTE and A. W. SCHOPPER Jul. 1984 55 p
(AD-A145472; AD-E750919; USAARL-84-11) Avail: NTIS HC A04/MF A01 CSCL 05E

This report on individuals wearing a warm weather uniform presents the results of an anthropometric cockpit compatibility evaluation conducted with individuals wearing a worst-case tactical clothing configuration; i.e., a combination of cold weather, armored vest, and chemical defense protective clothing. Subjects corresponding in stature to the uppermost and lowermost 5th percentiles of the Army male population were placed in the cockpits of all current US Army helicopters (except AAH-64) and fixed-wing aircraft, and requested to demonstrate critical operational reaches with the shoulder harness unlocked. A relatively wide range of upper- and lower-body reach requirements were encountered. With the exception of a very large requirement associated with the TH-55 helicopter, upper-body reach requirements, as measured by total arm reach (span), ranged from 147-173 cm. For crotch height, the measure of leg-reach capability found most efficient, the range was 69-78 cm. Four aircraft could not accommodate the individual with the tallest sitting height (102) cm. GRA

N85-11548# Air Force Human Resources Lab., Brooks AFB, Tex.
AIR FORCE HUMAN RESOURCES LABORATORY REPORT: FISCAL YEAR, 1983 Final Technical Paper 1 Oct. 1982 - 30 Sep. 1983
R. M. BUESCHER Aug. 1984 141 p
(AD-A145647; AFHRL-TP-84-2) Avail: NTIS HC A07/MF A01 CSCL 14B

This Annual Report presents the organization and activities of the Air Force Human Resources Laboratory (AFHRL) for FY83. The Laboratory's activities are reported as Technical Achievements

and as Ongoing Research and Development (R&D) as determined by the degree of completeness of the project. Additionally, the activities are presented in terms of the Laboratory's major thrusts and subthrusts: Diagrams highlighting the R&D thrusts (Maintenance and Combat Support, Training Design and Delivery, Manpower and Force Management, and Air Crew Training) and their subthrusts are presented to provide the context for the descriptions of specific projects. GRA

N85-11549# Navy Personnel Research and Development Center, San Diego, Calif.
HUMAN ENGINEERING DATA BASE FOR DESIGN AND SELECTION OF CATHODE RAY TUBE AND OTHER DISPLAY SYSTEMS Technical Report, Sep. 1982 - Jun. 1984
D. MEISTER Jul. 1984 362 p
(AD-A145704; NPRDC-TR-84-1) Avail: NTIS HC A16/MF A01 CSCL 05E

This guide is intended to serve as a source of basic data for display engineers on human capabilities and performance as related to the visual display characteristics of CRT and other displays. Its primary purpose is to acquaint visual display engineers with what is currently known about the relation between observer characteristics and various types of display applications. The literature dealing with operator performance in using electronic displays has been compiled to serve as a human performance data base and guide for the design of new Navy systems. GRA

N85-11550# Research Inst. of National Defence, Umea (Sweden). ABC Research Dept.
RESPIRATORY PROTECTION FOR CHILDREN 3 - 6 YEARS OF AGE
P. G. JOENSSON, L. SANDBERG, and R. SUNDQVIST May 1984 26 p refs In SWEDISH; ENGLISH summary
(FOA-C-40197-C2; ISSN-0347-2124) Avail: NTIS HC A03/MF A01

Two respiratory devices for young children, a mask and a tight protection jacket, are described. The devices were tested for 25 min on 86 children in the first case and 122 in the second. Protection properties, comfort aspects, and the children's tendency to accept the protective device were compared. The mask is better tolerared than the jacket. Author (ESA)

N85-11551# Linkoeping Univ. (Sweden). Dept. of Biomedical Engineering.
THE WATER VAPOR RESISTANCES OF SOME CLOTHING ASSEMBLIES USED BY FLYING PERSONNEL OF THE SWEDISH ARMED FORCES: A SERIES OF MODEL STUDIES
A. L. NILSSON, G. E. NILSSON, and L. E. ERIKSSON May 1984 35 p refs
(FOA-C-59011-H1; ISSN-0347-7665) Avail: NTIS HC A03/MF A01

Water vapor resistance of clothing assemblies used by the flying personnel of the Swedish armed forces was determined using a dish filled with an evaporative solution above which the clothing was fixed. Measurements were performed in a hot, dry environment without forced convection and temperature gradients. Flying suits made from Kermel are more resistive to sweat transfer compared to those made from Ventile fabric. Eiser sweat absorption shirts and Irotermo sweat absorption shirts have the same sweat transfer properties. Eiser underwear and Irotermo underwear have better sweat transfer properties than cotton underwear. Water vapor resistance depends on the sodium chloride concentration in transferred sweat. Water vapor resitance for complete clothing diminishes when the clothing becomes partly wet. Water vapor transfer can be improved by applying an air pressure gradient. Author (ESA)

N85-11552# Research Inst. of National Defence, Stockholm (Sweden).
TESTING OF THREE DIFFERENT FLIGHT SUITS IN FIRE ENVIRONMENT
C. SPAANGBERG May 1984 67 p refs In SWEDISH; ENGLISH summary Sponsored by Swedish Material Administration of Armed Forces
(FOA-C-59012-H1; ISSN-0347-7665) Avail: NTIS HC A04/MF A07

Flight suits manufactured from cotton, cotton/polyester, and polyamide-imide were fire tested on a glass fiber reinforced plastic arm. The surface temperature of the arm was adjusted to 27/33 C by water circulation inside; the surface temperatures of the arm were measured by thermocouples. Results show that the protection assured by the suits depends on the type of fabric and the thermal insulation under the suits. Two of the suits shrank during the first seconds exposure, so that the isolating air layer mostly disappeared. The resistance to heat is much better with the isolated-type suit, the fabric of which has two stable, not very porous, heavy layers. The thermal damage to the dermis and epidermis was evaluated for each test. Author (ESA)

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PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

A85-10370
PRESENCE OF A SUPERPARAMAGNETIC COMPONENT IN THE ORGUEIL METEORITE
T. J. WDOWIAK and D. G. AGRESTI (Alabama, University, Birmingham, AL) Nature (ISSN 0028-0836), vol. 311, Sept. 13, 1984, p. 140-142. Research supported by the University of Alabama. refs

The Orgueil CI carbonaceous chondrite meteorite fall of May 14, 1864 is of particular interest because of the presence of an organic component which included amino acids. Using Moessbauer spectroscopy, it has been determined that the Orgueil meteorite contains an appreciable fraction of its iron in the superparamagnetic state. This result implies that the superparamagnetic iron component was formed during an aqueous phase in the history of the parent body, and that the superparamagnetic component may have served as a catalyst for formation of the organic component. Author

A85-12196* California Univ., La Jolla.
THE SPARK DISCHARGE SYNTHESIS OF AMINO ACIDS FROM VARIOUS HYDROCARBONS
D. RING (Cetus Corp., Immune Div., Palo Alto; California, University, La Jolla, CA) and S. L. MILLER (California, University, La Jolla, CA) Origins of Life (ISSN 0302-1688), vol. 15, no. 1, 1984, p. 7-15. refs
(Contract NAGW-20)

The spark discharge synthesis of amino acids using an atmosphere of $CH_4+N_2+H_2O+NH_3$ has been investigated with variable pNH_3. The amino acids produced using higher hydrocarbons (ethane, ethylene, acetylene, propane, butane, and isobutane) instead of CH_4 were also investigated. There was considerable range in the absolute yields of amino acids, but the yields relative to glycine (or alpha-amino-n-butyric acid) were more uniform. The relative yields of the C3 to C6 aliphatic alpha-amino acids are nearly the same (with a few exceptions) with all the hydrocarbons. The glycine yields are more variable. The precursors to the C3-C6 aliphatic amino acids seem to be produced in the same process, which is separate from the synthesis of glycine precursors. It may be possible to use these relative yields as a signature for a spark discharge synthesis provided corrections can be made for subsequent decomposition events (e.g. in the Murchison meteorite). Author

A85-12197* Salk Institute for Biological Studies, San Diego, Calif.
PREBIOTIC FORMATION OF 'ENERGY-RICH' THIOESTERS FROM GLYCERALDEHYDE AND N-ACETYLCYSTEINE
A. L. WEBER (Salk Institute for Biological Studies, San Diego, CA) Origins of Life (ISSN 0302-1688), vol. 15, no. 1, 1984, p. 17-27. refs
(Contract NSG-7627)

The 'energy-rich' thioester, N-acetyl-S-lactoylcysteine, is formed from low concentrations of glyceraldehyde and N-acetylcysteine under anaerobic conditions at ambient temperature in aqueous solutions of sodium phosphate (pH 7.0). Reactions with 2mM glyceraldehyde, 2mM N-acetylcysteine, and 500 mM sodium phosphate (pH 7.0) convert about 0.3 percent/day of the glyceraldehyde to lactoyl thioester. The formation of lactoyl thioester in similar reactions with 500 mM imidazole hydrochloride (pH 7.0) is supported by the thiol-dependence of lactate formation, which is 3-fold greater in the presence of thiol (0.11 percent/day) than in the absence of thiol (0.04 percent/day). The formation of lactoly thioester is thought to proceed by the phosphate (or imidazole)-catalyzed dehydration of glyceraldehyde, which adds to the thiol to form a hemithioacetal that rearranges to the thioester. A limited amount of a second thioester, N-acetyl-S-glyceroyl-cysteine, is also formed at the beginning of these reactions. The significance of these reactions to the origin of life is discussed. Author

A85-12198* Rensselaer Polytechnic Inst., Troy, N. Y.
THE INVESTIGATION OF THE HCN DEREIVATIVE DIIMINOSUCCINONITRILE AS A PREBIOTIC CONDENSING AGENT - THE FORMATION OF PHOSPHATE ESTERS
J. P. FERRIS, H. YANAGAWA, P. A. DUDGEON, W. J. HAGAN, JR., and T. E. MALLARE (Resselaer Polytechnic Institute, Troy, NY) (International Conference on the Origins of Life, 7th, Mainz, West Germany, July 11-15, 1983) Origins of Life (ISSN 0302-1688), vol. 15, no. 1, 1984, p. 29-43. refs
(Contract NSF CHE-79-24364; NSF CHE-83-04466; NGR-30-018-148)

A85-12199* Alabama Univ., Birmingham.
HYDROLYTIC PROPERTIES OF PHENYLALANYL- AND N-ACETYLPHENYLALANYL ADENYLATE ANHYDRIDES
J. C. LACEY, JR., D. W. MULLINS, JR. (Alabama, University, Birmingham, AL), and N. SENARATNE (Maryland, University, College Park, MD; Alabama, University, Birmingham, AL) Origins of Life (ISSN 0302-1688), vol. 15, no. 1, 1984, p. 45-54. refs
(Contract NGR-01-010-001)

The hydrolysis of phenylalynyl- and N-acetylephenylalanyl adenylate anhydrides (AcPhe-AMP) is studied experimentally using a new spectrophotometric method. The hydrolysis process was analyzed at low concentrations (0.0001 M), constant temperature of 25 C, constant buffer concentration (0.05 M), and as a function of pH. It is found that while Phe-AMP is susceptible to attack by OH(-), AcPhe-AMP is susceptible to acid decomposition as well. At a pH of 4 to 8, Phe-AMP hydolyzes faster than AcPhe-AMP, but at pH less than four or greater than eight, the blocked form hydrolyzes faster. Both forms are attacked by H2O at the same rate. The rate laws for the various hydrolytic mechanisms and the activation energies for the hydrolyses at pH 7.1 are given in a table, and the possible relevance of the findings to the origin and evolution of the process of protein synthesis is discussed. I.H.

A85-12200* George Washington Univ., Washington, D.C.
CHEMICAL EVOLUTION AND THE ORIGIN OF LIFE BIBLIOGRAPHY SUPPLEMENT 1982
L. G. PLEASANT (George Washington University, Washington, DC) and C. PONNAMPERUMA (Maryland, University, College Park, MD) Origins of Life (ISSN 0302-1688), vol. 15, no. 1, 1984, p. 55-69. refs
(Contract NASW-3165; NGR-21-002-317)

N85-10657*# National Aeronautics and Space Administration, Washington, D. C.
PUBLICATIONS OF THE EXOBIOLOGY PROGRAM FOR 1981: A SPECIAL BIBLIOGRAPHY
L. G. PLEASANT, comp. (George Washington Univ., Washington, D.C.) and D. L. DEVINCENZI, comp. Aug. 1984 39 p
(Contract NASW-3165)
(NASA-TM-86653; NAS 1.15:86653) Avail: NTIS HC A03/MF A01 CSCL 06C

A list of 1983 publications resulting from research pursued under the auspices of NASA's Exobiology Program is given. Topics in the fields of biological, chemical, and planetary evolution; geochemistry; and intelligent extraterrestrial life are listed. R.J.F.

AEROSPACE MEDICINE AND BIOLOGY / *A Continuing Bibliography (Supplement 268)* FEBRUARY 1985

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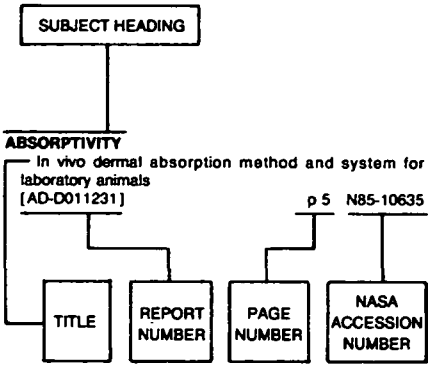

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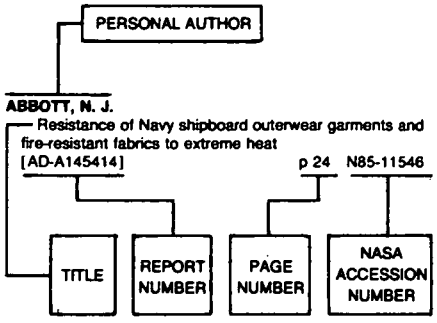

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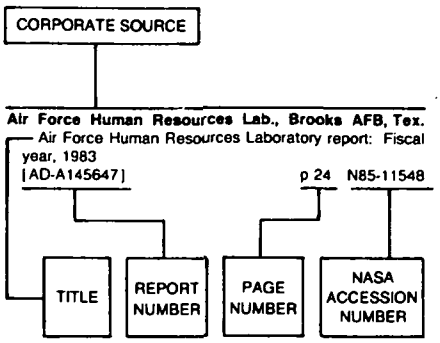

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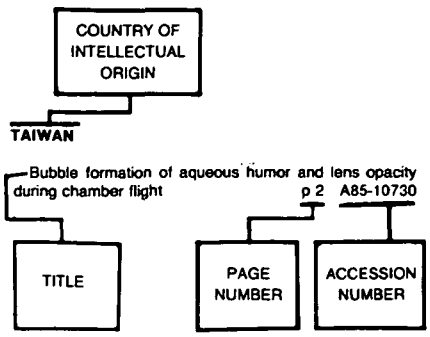

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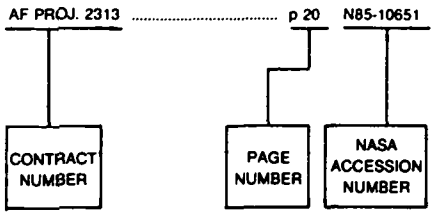

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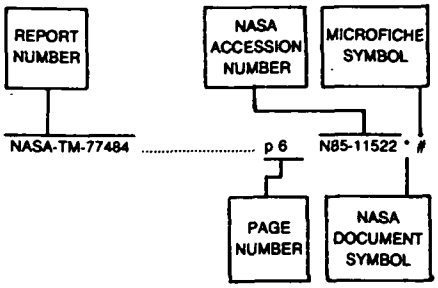

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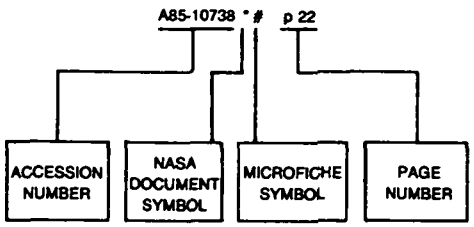

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